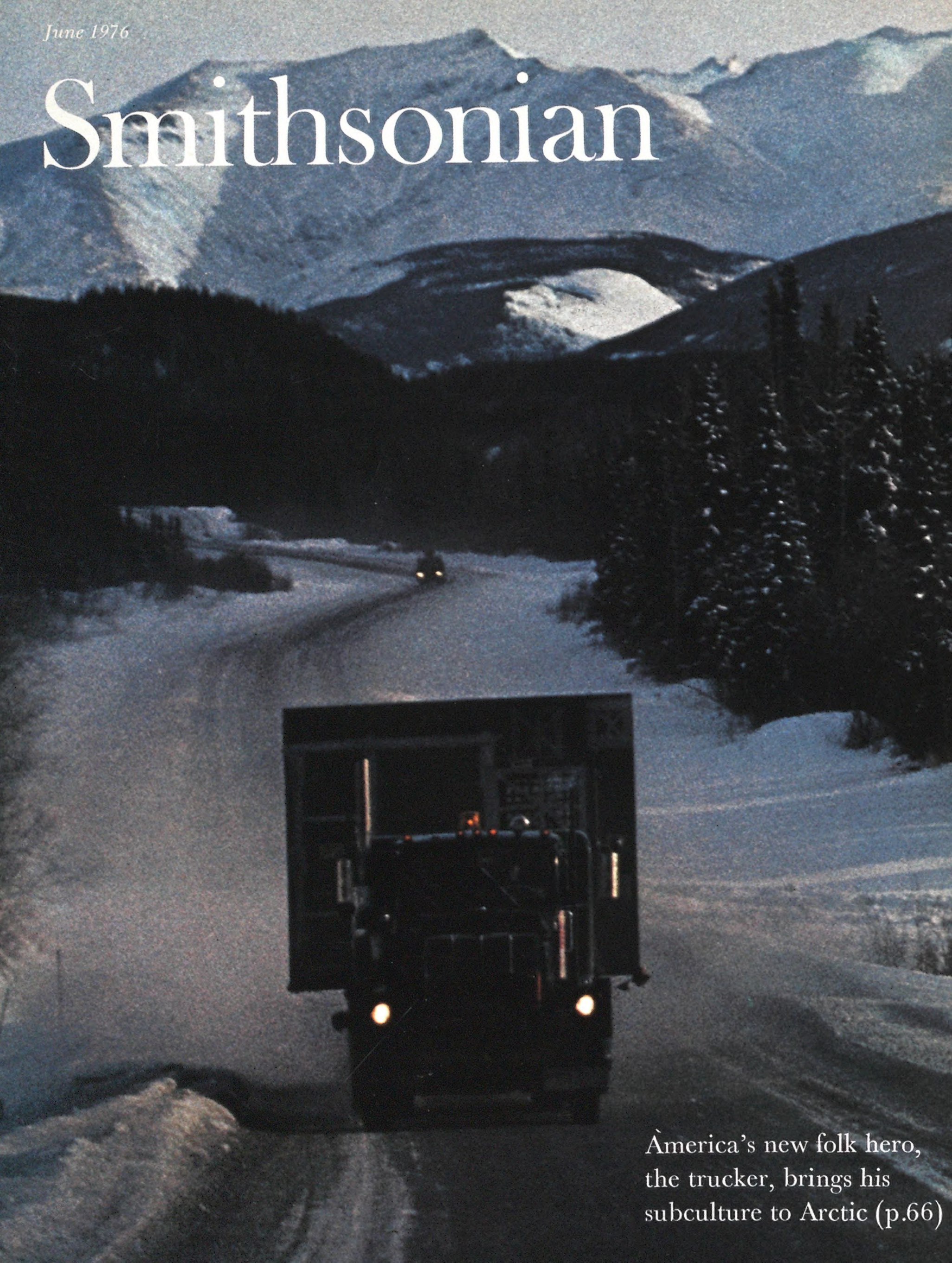
June 1976

Smithsonian



America's new folk hero, the trucker, brings his subculture to Arctic (p.66)

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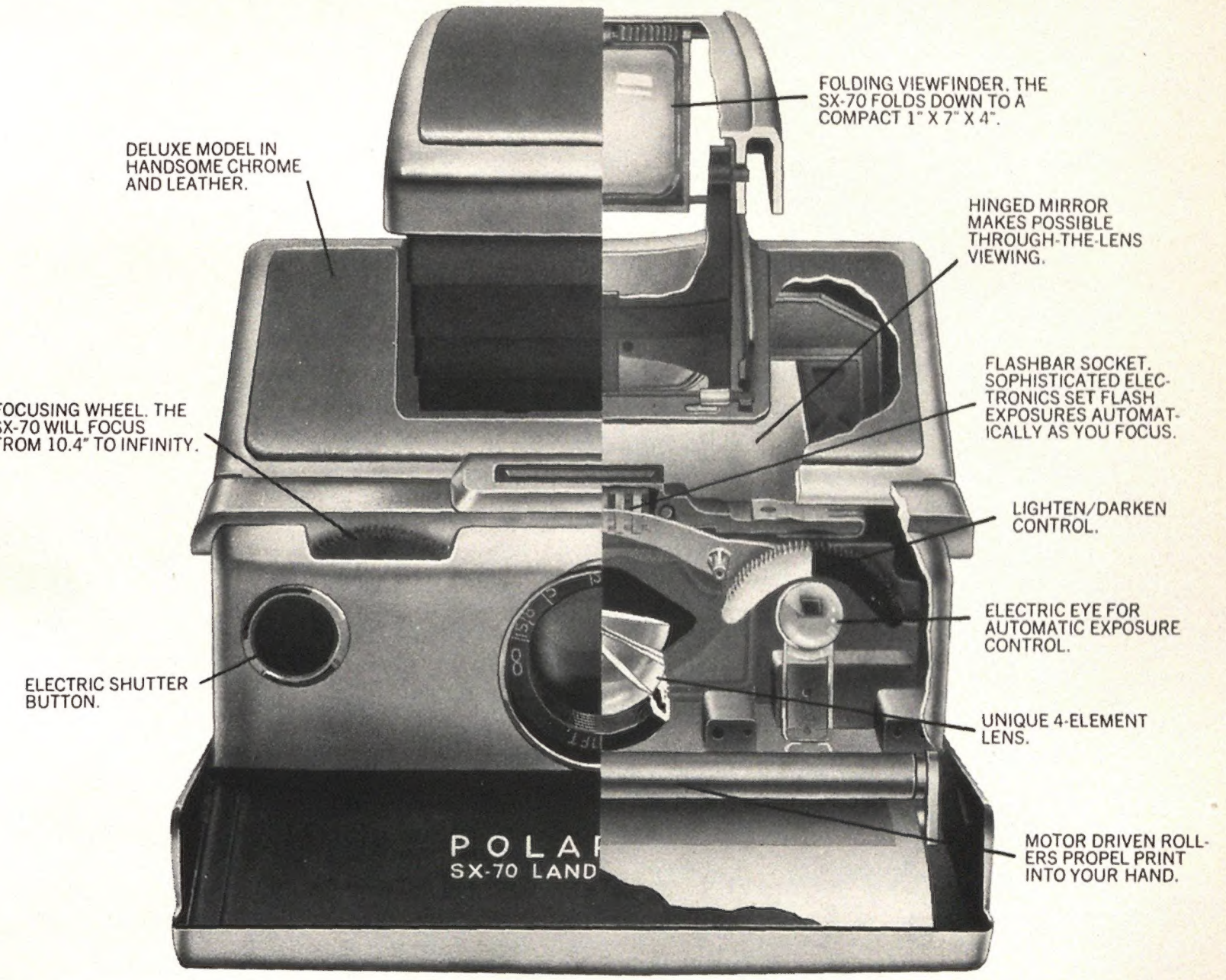
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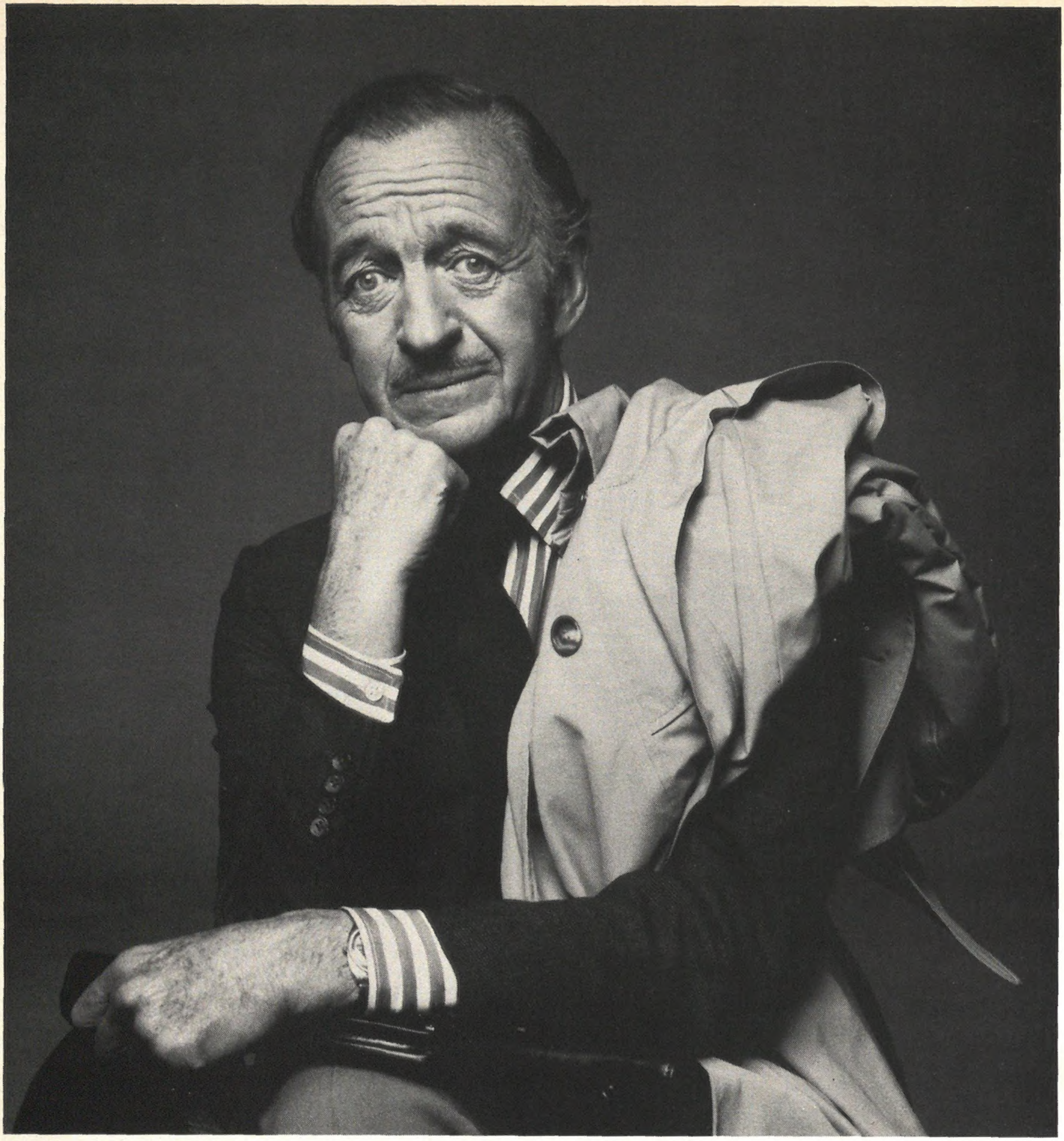

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June 1976

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Dick Dent's job was made in Belgium.

Dick and his family live at 2905 Phillips St. in South Charleston, West Virginia.

He works just ten minutes away at the local Union Carbide plant.

But his job was created thousands of miles away.

You see, Dick's job is to make special chemicals called catalysts.

These catalysts are shipped to Belgium and other countries where Union Carbide plants depend on them to make petrochemicals that are sold abroad.

This interdependence is not unusual in the countries where Union Carbide and its affiliates work.

By manufacturing abroad we have actually increased the foreign demand for many products we make here at home.

This in turn has created more jobs here at home. A recent study shows our investment overseas has directly created at least 2,500 jobs in our plants in the U.S.

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In fact, we export products from America to 100 foreign countries.

All of which is another way of saying that our international investment is helping improve the standard of living for people abroad and at home.

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Today, something we do will touch your life.

Secretary Ripley's comments

The view from the castle

The drought in the Sahel is over,
but the lessons learned there should
be applied to large areas of world

Northern Africa, south of the coastal fringes, consists largely of the vast Sahara edged to the south by the so-called Sahel region, an arid land of scattered vegetation and temporary grassland with never more than 25 inches of rainfall annually. South of this, near the Atlantic in the west and east to the Indian Ocean, lies the slightly moister belt of the savannah zone which occupies much of mid-Africa short of the mountains, and has somewhat more rainfall.

The disastrous droughts beginning in the late 1960s in the Sahel (see SMITHSONIAN, September 1973) were ended by normal rainfall in 1974. Consequently, the nations themselves as well as the U.N. agencies and the U.S. Agency for International Development are looking forward to intensified food production with, in some areas, settled farming as against the traditional nomadic way of life, and to restoration of hope for the future after the loss of more than 100,000 lives and vast numbers of cattle, sheep and goats of the graziers. Additionally, reforestation has been started to arrest the devastating cutting of trees as food for stock, new wells are being bored for irrigation and water storage, and there are water desalination projects along the newly urbanized seacoast. With luck and continued rainfall, disaster can be averted next time.

All of this is in the spirit of the encouraging Rome Conference on World Food Resources of 1974. Unfortunately, however, the latest Food and Agriculture Conference in Rome last November reminded us that man is short on memory and long on selfishness. The urge for improvements in areas like the Sahel may soon be offset by complacency and declining budgets.

All such plans will fail unless economists and government planners do two things, the first of which is to consult the knowledgeable prehistorians and ecologists. Specialists like Théodore Monod and J. L. Cloudsley-Thompson could show that the Sahel is a succession stage in the evolution of the Sahara itself during the last 5,000 years. Some experts do not so much see the Sahara moving southward (it has swallowed up an estimated 250,000 square miles in the last 50 years) as being pulled southward by the activities of Man. Where formerly cycles of drought produced die-offs in wild animals, thus allowing vegetation a recovery period, Man as a grazier with domestic flocks and the need for firewood pushed the ecosystem beyond its capacity. Failure of plant regeneration produced the deserts in large part, with winds removing soil and the ensuing dust pall causing a reduction in rainfall.

Secondly, only radical rethinking of the human use of such land in the light of known history will be effective. New sources of energy including solar radiation, mining, light industry, tourism: all must be combined with reforestation and high-intensity food production using disciplined new techniques. Also to be considered are ways to control population growth and grazing, the fragility of the environment, the value of the nomadic life's flexibility.

The lessons of the past are here for our productive use, stretching from the Sahel, a current high priority, across Asia to China. Their message hangs over all the tropical belts of the planet. If we do not observe them, Man's folly will be compounded forever.

S. Dillon Ripley

OF ALL THE THINKING THAT WENT INTO VOLVO, THIS IS WHAT WE THOUGHT OF MOST.

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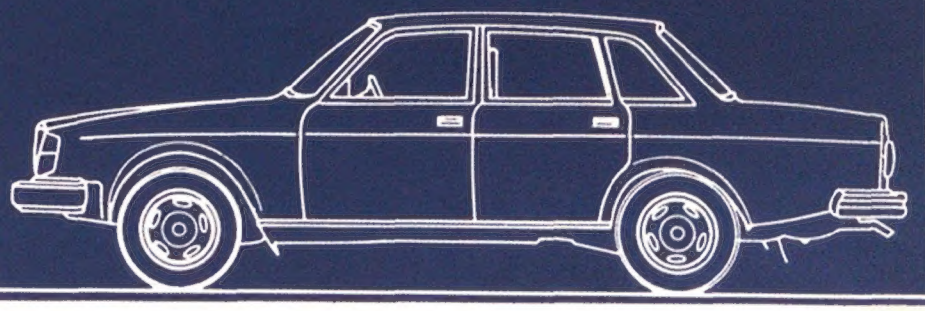

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We want to make sure there'll still be enough wood products around when your children grow up.

Industry sources estimate Americans will use about twice as much paper and wood in the year 2000 as they use today. And the U.S. Forest Service predicts that our nation's commercial timberlands won't be able to keep up with the demand.

One of our solutions is to help private landowners increase their yield. They own about 60 percent of America's forest lands—yet produce only 30 percent of the wood fiber. (Forest products companies own only 13 percent of America's forest lands—and produce 34 percent of the wood fiber.)

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How we help landowners

We do it through the Landowner Assistance Program.

We'll show a private landowner how to prepare a site, plant, protect, thin, and harvest—at no charge.

This way, he can get the most from his forest land—in some cases, he can actually *double* his yield.

We'll even find a contractor to do the actual work. Or do the job ourselves at cost.

For this help, IP gets the right to buy a landowner's timber at competitive prices.

We've got more than 300,000 acres in the Landowner Assistance Program now. We're aiming for 1,000,000 before 1980.

A big help. But it's only one thing we're doing to increase the world's wood-fiber supply.

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At International Paper, we believe forest products companies, private landowners and the government should work together to develop more constructive policies for managing America's forests.

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Phenomena, comment and notes

The nice thing about the crocodile, détente with slugs, advice about Bicentennial traffic and backstops

If a youngster interested in baseball is relegated to the dusty, finger-spraining job of catcher, the wisest course is either to take up tennis or to give up the he-man attitude necessary to emulate Johnny Bench and wear a falsie.

That, at least, is the advice one gains from *Medical World News* (Volume 17, Number 7), a magazine which fairly regularly reports on the hazards of athletics to athletes. In this particular instance, a hand surgeon at Tulane, Dr. Cedric W. Lowrey, is said to have discovered that playing catcher with the usual catcher's mitt damages the blood vessels in the index finger, usually irreparably, causing swelling and "delayed perfusion." (First basemen, shortstops and outfielders are also subject to this symptom.)

Dr. Lowrey recommends that catchers wear a glove under the mitt and a piece of sponge rubber in between, such as the padding from a bra. But, no fool he, Dr. Lowrey recognizes that even Little Leaguers are too macho for that and is busily inventing a prototype inner glove with silicone padding to wear under the mitt. In the meantime, parents of young catchers should encourage them to signal for the slow curve.

Fathering

Well brought up children are warned never to smile at a crocodile, which seems to be sound enough advice, but since fashion smiles upon the crocodile's hide,

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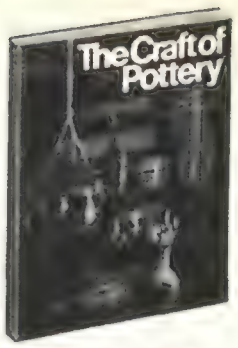

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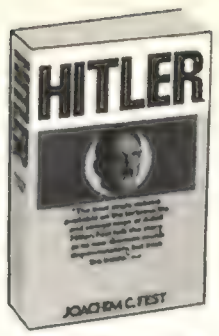

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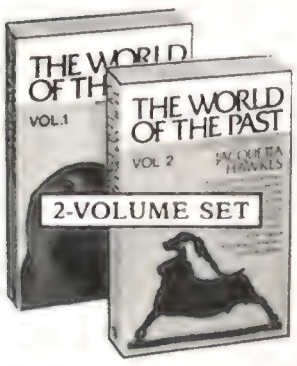

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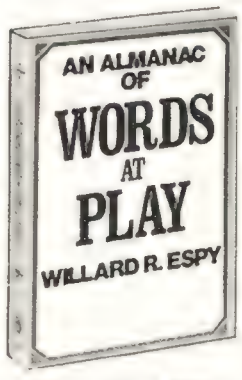

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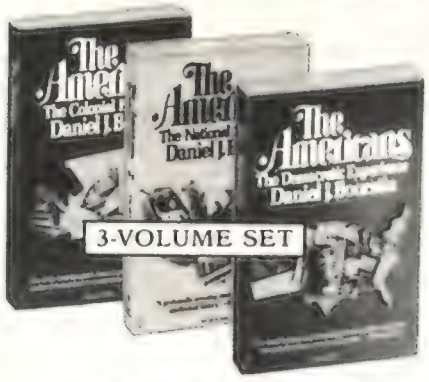

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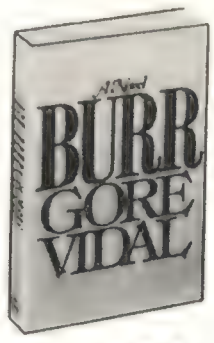

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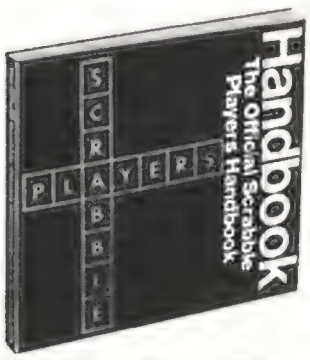

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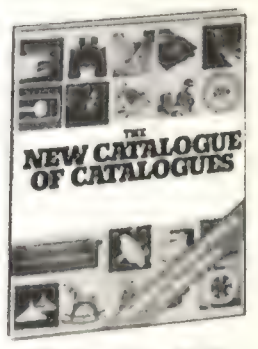

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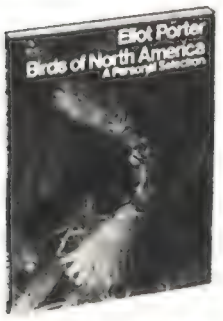

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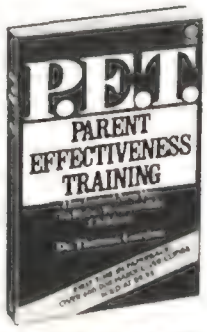

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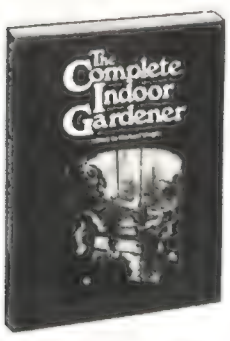

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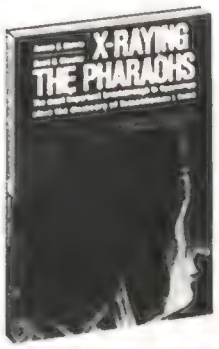

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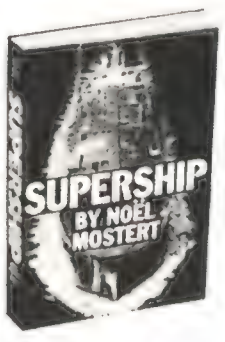

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these remarkable creatures may be heading for extinction. Even in the case of so unlovable a beast, that would be a shame —for all of the usual philosophical reasons but also because, it turns out, the crocodile has some estimable, even lovable, characteristics.

Writing in *Scientific American* (Volume 234, Number 4), two zoologists, Anthony C. Pooley and Carl Gans, find examples of cooperation, loyalty and gentleness among Nile crocodiles. For example, if a crocodile catches prey which is too big to eat in one bite, but too small to break in half by snapping it like a whip, it will seek out another crocodile to take the other end: each one gets half. Pooley has seen two crocs, side by side, bringing a carcass across the ground to the water, and several crocs in a semicircle in freshening spring streams, making a formidable sieve to catch fish.

Crocodiles are inclined to monogamy, at least during the sexually active part of the year (when it counts), and while the female fasts near the nest during the time the eggs are incubating, the male provides further defense by patrolling a somewhat larger perimeter than his mate.

Furthermore, the male sometimes assists in hatching by taking an egg in its mouth and rolling it between the tongue and palate until it cracks and the baby, one four-thousandth the weight of a parent, emerges. "The same jaws that can crush the femur of a Cape buffalo can pick up an egg without harming the little crocodile inside," write the zoologists with straightforward admiration.

Slugging it out

Far more odious in anyone's frame of reference than the crocodile is the common garden slug, a pest with so little likelihood of becoming extinct (even locally) that it drives the organic gardener "perilously close to a panicky retreat to the poison shelf." So, at least says Jerry Land, a romance-language teacher, in *Horticulture* (Volume 53, Number 12).

But Mr. Land, who must qualify for the St. Francis of Assisi Award this year, refuses to resort even to unnecessary cruelty in controlling slugs in his organic Oregon garden: pouring salt on slugs makes for a painful, slow death (and may damage the soil). Better to skewer them quickly with a stick.

A saucer of beer or wine attracts slugs and they drown themselves in it, but Mr. Land wonders whether slugs' sense of smell isn't so great that a saucer of beer will attract your neighbors' slugs, too.

Natural enemies of the slug include peacocks, which would certainly dress up the usual vegetable garden, toads, skunks and fireflies, as well as centipedes and ground beetles.

In any event, you'll never be totally rid of them. In a remarkable and perhaps uncalled for effort to see the world from different eyes, Mr. Land writes: "We are, after all, a gigantic problem to the slug, too, ruthless competitors for those plants necessary to his very existence. . . .That he will survive is certain; it would be comforting to feel equally sure about our own survival."

In praise of science

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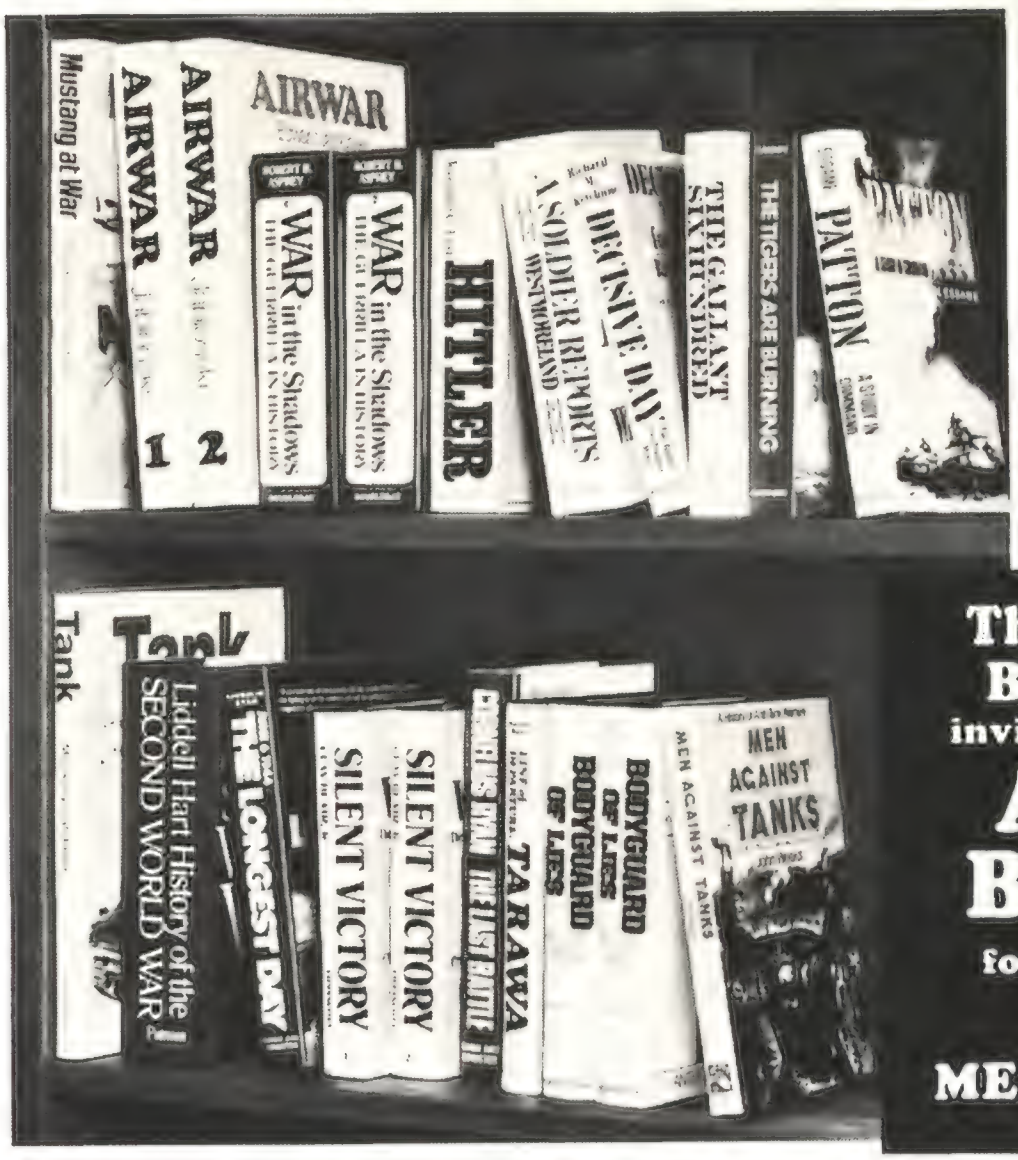

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out of it. An instance in favor of this proposition has come to light in the matter of a creature even less lovable than the slug: the tick. Even the most ecologically hip Jonah might suggest respectfully to the Creator that he had no business visiting ticks upon the scene. After all, there are other ways of weeding out the lame, halt and blind among wild mammal populations, and dog owners have better things to do than pick ticks from beloved Fido's ears.

Appropriately, scientists seek to control ticks, and one way is to use a hormone called ecdysone which, among ticks and insects, promotes molting and which eventually disappears, usually at sexual maturity. Idea: keep pumping ecdysone into mature ticks and maybe they will have a "super-molt" and be rendered defective. Neat, eh?

Wrong. Three scientists from Nairobi report in *Nature* (Volume 260, Number 5549) that they have found that male ticks thus treated become defunct but that females thrive on an additional fix of ecdysone. They not only molt again, they go forth and consume a larger meal (of blood, mind you) and then lay twice the usual 250 eggs. Give them yet more ecdysone and they molt yet again, ultimately achieving nine times the normal weight of female ticks and an undetermined amount of greater fecundity.

Down with ecdysone! Thank you, science, for rescuing us from you.

Traffic advice

On the subject of infestations, it is interesting to note that a great deal of campaign rhetoric is being directed against Washington, D.C., these days, and, by implication, against that quadrennial fall guy, the parasitical bureaucrat. This, paradoxically, at the same time that 18 million citizens are expected to arrive of their own volition to spend part of the summer in this stronghold of bureaucracy.

To begin with, 18 million people is greater by an order of magnitude (a deliciously appropriate astronomical bit of jargon) than the entire population of the Washington metropolitan region. Indeed, 18 million is somewhat less than ten percent of the entire population of this land.

But, wait: a word about bureaucrats. They make up what is called the Civil Service, a pleasant phrase, and in general they really are quite civil. There is, for

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Whether you look at it in social and humanitarian terms, or as a matter of cold economic reality, it comes out the same. The private sector—*business*—must maintain jobs and create new ones. And that means business must find the money to do it.

How many future jobs?

Right now, America needs millions of jobs to get people back onto business payrolls.

But there's also the challenge of a growing work force. 1½ million *new* jobs are needed *every year* from now through 1980—just to employ the young people reaching working age, and others entering the job market.

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But this alone is not enough because under present Federal tax laws the government would take too much of any additional dollars we can earn.

What we need now is Federal tax reform to help lower barriers to capital formation.

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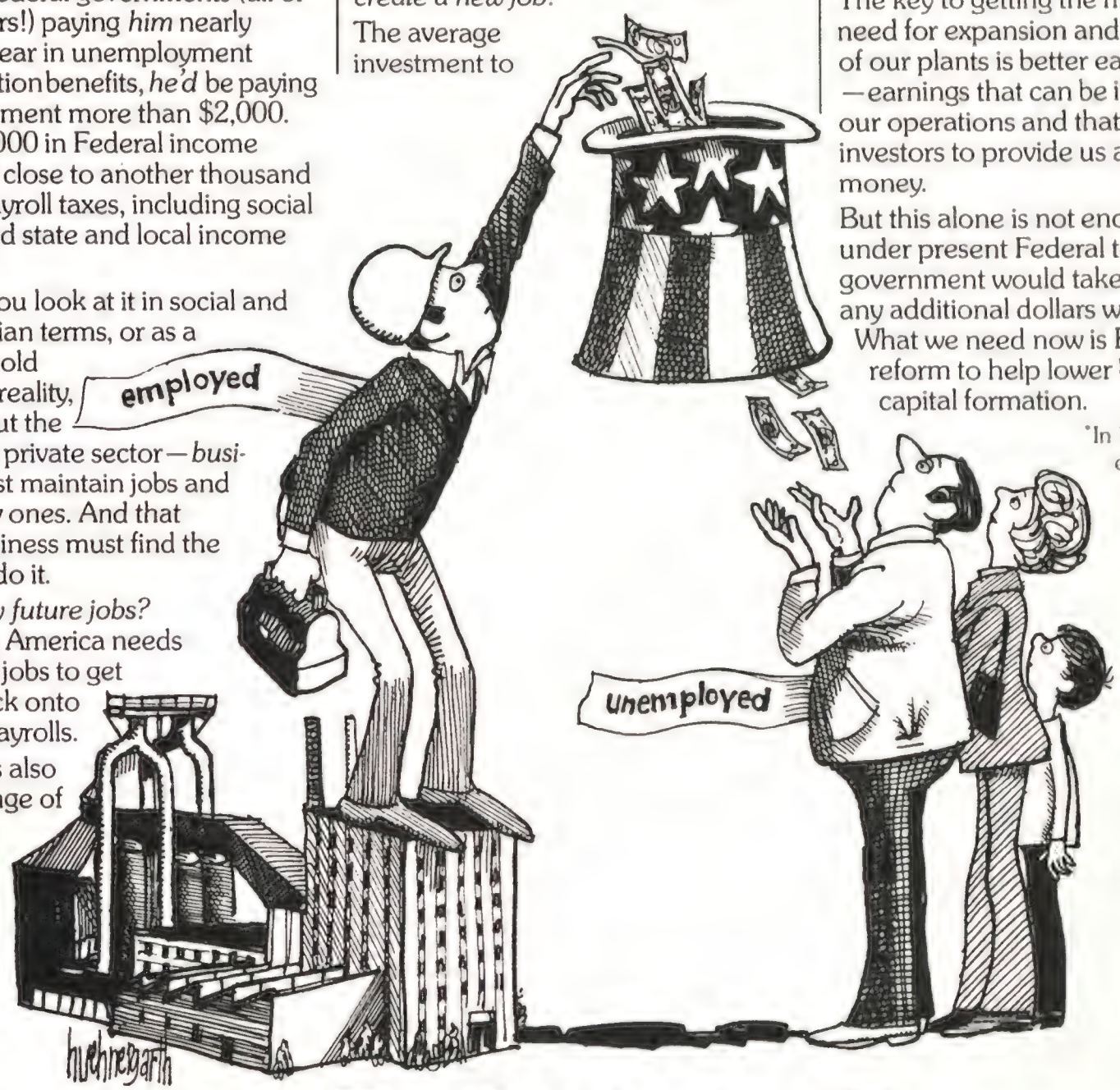

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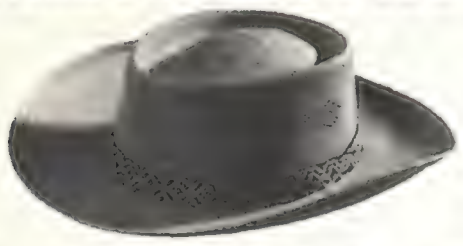

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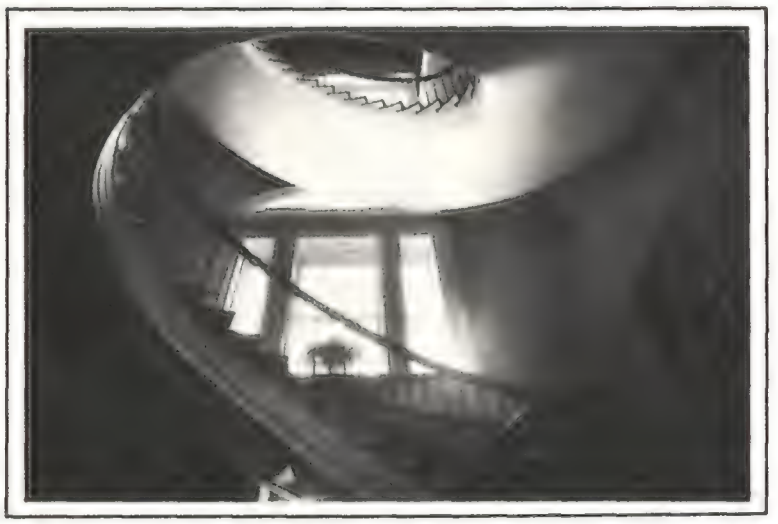

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example, relatively little horn-honking in Washington, even during the most disastrous traffic tangles of a normal summer rush hour. (An informal survey, by the way, shows that most of the horn-honking that does go on emanates from automobiles bearing Maryland license tags.) But traffic snarls up at a geometric rate, not an arithmetical rate, especially in a city where the roads are so badly marked. So you can expect monumental traffic jams.

Now, when he is not lurking around the exhibit halls and laboratories of the Institution, a fellow SMITHSONIAN columnist, Edwards Park, spends time staring out of his third-story tower office at the people who come to visit this institution. Based on his observations of the Easter crowds, he asserts that it is a terribly nice-looking group of people that are visiting Washington this year—nice-looking families, well-dressed, having a good time. No doubt he is right. The next three months, however, will be the true test of civility and kindness for us all, visitor and visitee.

So when the mercury rises above 90 degrees and your Mercury overheats precisely in the middle of a key intersection (and here they are all key intersections) and finally some usually civil and hopelessly outnumbered bureaucrat who is already late for work, summons up the courage to express his utter frustration and gives what in New York City would be considered a timid toot on his horn, please remember: no one filed a very complete environmental impact statement when we all decided to celebrate the Bicentennial. Not you. Not the bureaucrats—not even the ones in charge of the celebration.

Anyway, welcome.

JAMES K. PAGE JR.

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Each of these works of art has been created—exclusively for this collection—by the distinguished American artist Albert Earl Gilbert. Mr. Gilbert was selected for this important commission by the National Audubon Society.

Among art critics and ornithologists alike, Albert Earl Gilbert is recognized as one of the world's finest wildlife artists. One of the very few living artists, in fact, whose works are considered worthy to stand beside those of John James Audubon himself.

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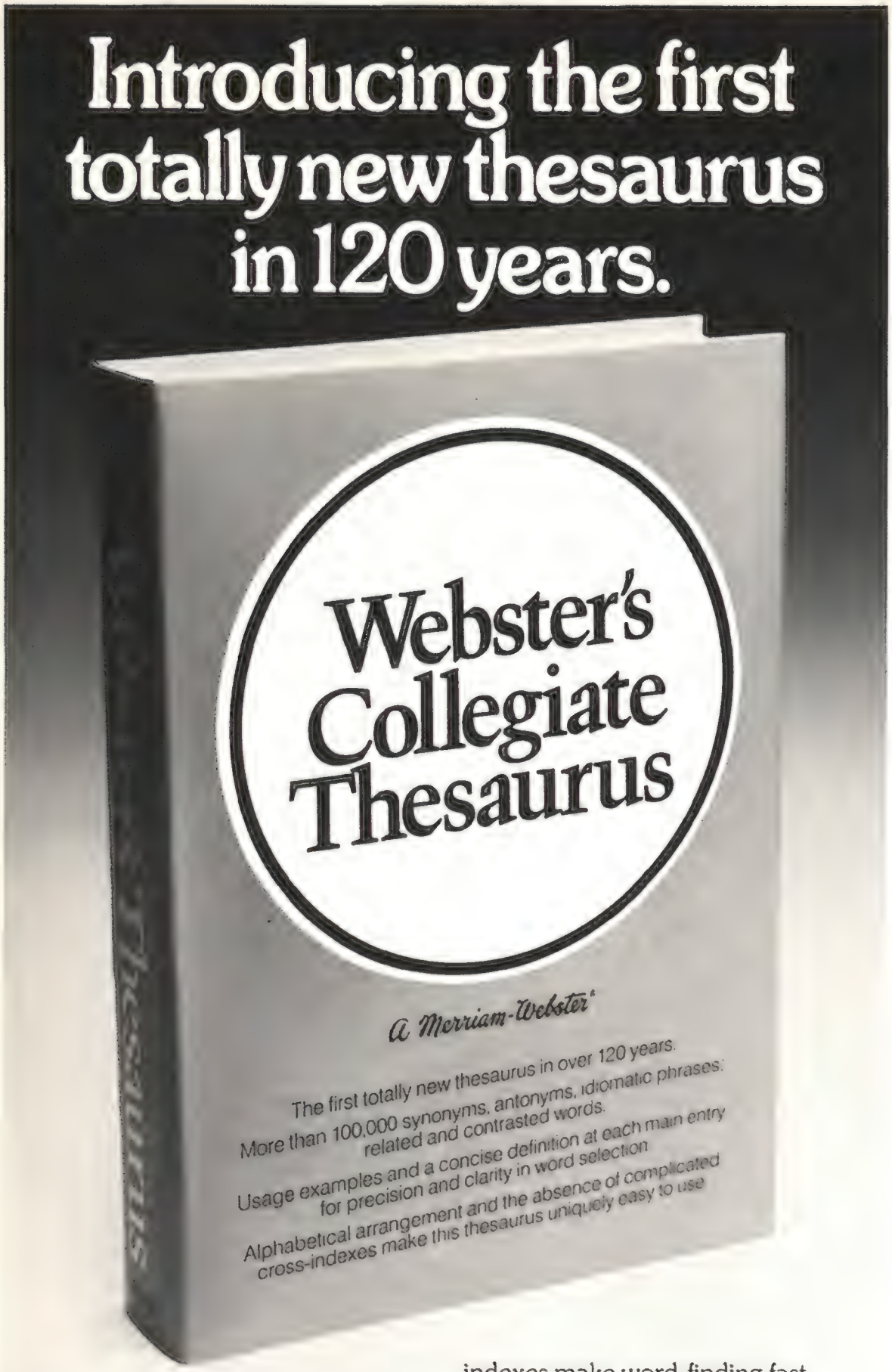
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Letters to the Editor

Democratic convention of 1924

Dear Sir: My compliments to author Robert K. Murray for his excellent article, "The Democrats vs. Frustration City: it was no mix," in the April issue. As an elected delegate to the 1976 Democratic convention to be held in New York City, I found the historical information in your article filled with excitement and drama, as will be the case this summer.
H. Brent De Land
Springfield, Illinois

Dear Sir: In your article on the disastrous 1924 Democratic convention, you say that Alfred E. Smith's parents were of Irish descent. I have read, but do not know if

Izzy and Moe, in foreground,

it is true, that Smith's father was of Italian descent.
Otto F. Johnson
Point Pleasant, New Jersey
One reason for the confusion is that Al Smith, in his autobiography, wrote: "I do not ever remember hearing [my father] tell where his parents came from." However, from the death certificate of Smith's father, dated 1886, we learn that the Governor's paternal grandfather was Italian, his grandmother German. Ed.

Dear Sir: As you say of New York at the time of the 1924 Democratic national convention, it was the Sodom of the prohibitionists, a place "where liquor was easier to get than water." That was, you know, despite the best efforts of the two most widely known prohibition agents of the period. Izzy Einstein and Moe Smith [see below] claimed they did their best to find signs of Volstead Act violations. They even posed as delegates—Izzy disguised behind a goatee and Moe under a sombrero. They found little boozing at the convention (one wonders how hard they were trying), but during their careers they seized some five million bottles of liquor and made 4,000 arrests.
Richard L. Mennen
New York City

Discovery

Dear Sir: The Argonauts' route, de-

break up an illegal New York still.

Children have always dreamed of running away to join the circus. And so it is with FunnyFace, captured in ruffles and greasepaint by the artists of Cybis.

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scribed by Mauricio Obregón, is not "impossible," as he says, but it does seem less practical than the version I learned in school in Slovenia. According to this theory, the Argonauts sailed up the Danube until they reached the site on which Belgrade stands today, then sailed west up the river Sava as far as Ljubljana and the lake that then existed to the south. From there it was 70 kilometers on rollers or logs to the Adriatic coast at Rijeka. This would shorten the voyage outlined by Obregón by some 700 kilometers, but the land haul would be some 40 kilometers longer.

In addition, the Argonauts would save another 600 kilometers of sea route, which would be required if they had to sail back to Greece around Italy rather than the shorter route down the Adriatic.
Vladislav Bevc
Danville, California

Gene Stratton-Porter

Dear Sir: Years ago, my mother was given a clutch of novels by Gene Stratton-Porter which she dutifully encouraged her children to read. The recollection lingers somehow of my being alternately fascinated by the nature lore but put off by the excessive sentimentality. I vaguely recall thinking that "they sure wrote sticky novels when Mama was growing up, even though there's lots of good stuff about wildlife." I'm sure this article has begun a revival of interest in Gene Stratton-Porter's works.
Jerrie G. Scholten
Princeton, New Jersey

Dear Sir: You misidentified the fledgling birds as kingfishers. They are really Old World hoopoes. The black tips on their crests tipped me off. [For fledgling kingfishers, see above.]
J. M. Dickinson
Ellsworth, Maine

George E. Watson, Smithsonian's Curator of Birds, agrees that Mr. Dickinson is correct. He points out that hoopoes, which build notoriously smelly nests, were pictured in Gene Stratton-Porter's Birds of the Bible. *She identified them there as "lapwings" (as hoopoes are also called in Leviticus 11:19 and in Deuteronomy 14:18). Dr. Watson also notes that the downy young scavenger pictured is a turkey vulture* (Cathartes aura), *not a black vulture* (Coragyps atratus). *Mrs. Stratton-Porter apparently based her identification on the bluish color of the addled egg she found with the young vulture.* Ed.

Fire ants

Dear Sir: H. Allen Smith in his article, "Nobel nemesis of fire ants: a new anteater," made some good points, but, in spite of Desmond Slattery's assurances, the African anteater is reckoned a very dangerous animal to fool with by people who live in Rhodesia and South Africa. I have been told there to keep away from them, that if you annoy them they will tear you to pieces in no time with their long claws. They are dangerous though, of course, they do not eat human beings.
Clarkson J. Beall
Fulton, Maryland

Misericords

Dear Sir: While reading "Naughty notions in holy places," I was reminded of the droll figures pointed out to us while visiting an old monastery in Spain. Near the bottom of one pillar, beautifully executed and artfully disguised, sat a monk on an old-fashioned chamber pot. So skillfully was it hidden in the conventional design that it would have gone unnoticed had our guide not specifically pointed it out to us.
Mrs. Allen Hills
Manhattan, Kansas

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1. Using advanced solid-state technology, the people of Western Electric and Bell Labs have developed over a dozen new lines of business telephone systems in the last two years.

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Jean Shrimpton wears Ray-Ban "Caravan" SunGlasses. Available in other colors.
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Dear Sir: The article on misericords by Dorothy and Henry Kraus was a delight. I believe that the illustration labeled "woman birching her son" is more likely a wife beating her husband. The theme illustrates the fight over who is going to wear the pants in the family. The misericord offers an early example of the "Equal Rights" debate.

Lilian M. C. Randall
Curator of Manuscripts and Rare Books
The Walters Art Gallery
Baltimore, Maryland

In their book, The Hidden World of Misericords, *the Krauses say: "An astonishing modern note is struck in the misericords by 'the fight for the culottes' . . . in which the woman was expected to be victorious." They use several illustrations but particularly the culottes misericord found in the Cathedral of Notre-Dame in Rouen [see below]. Their caption as stated in the article is correct—"woman birching her son."* Ed.

Letters

Dear Sir: "Letters to the Editor" provides some of my favorite reading, but some of your readers seem to be the nit-pickiest bunch I've ever run across. They take great delight in discovering and pointing out whatever tiny flaw that they can glean from your publication. I, for one, offer no complaints, only praise for your efforts.

L. L. Walther
Palatka, Florida

The sentiments of Mr. Walther are appreciated by SMITHSONIAN. *We happily publish letters with additional information on articles, but the section also exists to correct inadvertent errors which occasionally occur despite meticulous factual checking. We welcome letters pointing these out, too.* Ed.

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1

British Columbia, Canada.

These pictures are just a sample of what is waiting for you in British Columbia. 1. One of many intriguing shops that can be found throughout the Province. 2. Long Beach on Vancouver Island, 11 miles of unbroken beach on the Pacific Ocean. 3. The Williams Lake Stampede. Dozens of rodeos take place all summer long in British Columbia's cattle country. 4. An outdoor restaurant in Gastown, the original settlement of British Columbia's largest city, Vancouver. For more pictures and lots more information write: British Columbia Department of Travel Industry, 1019 Wharf Street, Victoria, British Columbia V8W 2Z2. Or see your local travel agent.

2

For the time of your life.

Summertime at the Smithsonian

The Smithsonian Institution has been renovating, building and planning for millions of visitors this summer. The Arts and Industries Building has reopened with "1876: A Centennial Exhibition" (see May SMITHSONIAN); the National Air and Space Museum opens July 1 (p. 44, this issue); and the Festival of American Folklife (p. 30) runs June 16-September 6. Every Smithsonian museum has opened major Bicentennial exhibits or entire new halls. This special detachable section will help you find them and, we hope, add to the enjoyment of your trip.

There is so much going on at the Smithsonian that there isn't space here to stray too far away. For information about other activities and sites in Washington, call or visit the Bicentennial Information Center (near the Museum of History and Technology), E Street between 14th and 15th Streets, N.W., telephone 737-6666, or the National Visitor's Center in Union Station, North Capitol Street and Massachusetts Avenue, N.E., 523-5033 (all telephone numbers listed are in Area Code 202, unless otherwise indicated). Information about National Park Service facilities may be obtained at the blue, green and white kiosks located on the Mall.

The *Official Guide to the Smithsonian* contains information about permanent exhibits; some of the most popular are flagged on the Mall map (pp. 28-29). This section offers supplemental information relevant to summertime and Bicentennial activities and exhibitions. If you aren't visiting Washington, it will give you an idea about what's going on. If you are, bring it with you. But before you come and discover the more pleasant aspects of summertime at the Smithsonian, be forewarned about what is anticipated as the major source of frustration: parking spaces—or the lack of them!

Crowds enjoy lunch amid umbrellas and sculpture of Café Hirshhorn.

Automobiles, bicycles, and where to leave them.

Parking downtown is limited. Commercial lots on or near the Mall include the garage under the Air and Space Museum on 7th St., S.W. (7 A.M. to 10 P.M.), the L'Enfant Plaza underground garage (open 24 hours) across Independence Avenue from the Smithsonian "castle," and an area on Maryland Avenue between 6th and 7th Streets, S.W. (hours vary). A few free spaces are available on Jefferson and Adams Drives on the Mall after 10 A.M.

These areas cannot begin to accommodate the expected crowds. To avoid looking for a parking space and adding to the pollution and traffic problem, please leave your car at home, at your hotel or at one of the special fringe-parking areas offering a fast and economical "park and ride" package to and from the Mall museums and the Folklife Festival grounds. Shuttle buses depart every two to five minutes from 9 A.M. to 10 P.M., with reduced service during the afternoon rush hours and the late evening hours. The fringe-parking areas are RFK Stadium, North Pentagon Parking Lot and Fort Myer South Post (adjacent to Arlington Cemetery).

In addition to these three areas, 17 radial bus routes in suburban Maryland and Virginia, with quick service to the Mall, have been established. Once on the Mall, Smithsonian facilities in other areas are easily accessible by public transportation. To find out exactly where to leave your car before coming to Washington, call, toll free, (800) 424-9755. Or if already in the

Washington metropolitan area, call 637-2437. For a copy of the Metrobus brochure, write: Metro, Box 1200, Washington, D.C. 20013.

Bicycle racks can be found at the Washington Monument and Lincoln Memorial grounds, and outside most Smithsonian museums.

Smithsonian castle: Visitors' and Associates' Reception Center

After arriving on the Mall, additional information may be obtained in the Reception Center located in the Great Hall of the red stone castle. Associates should register at their desk, which is staffed every day from 10 A.M. to 7 P.M., and pick up a specially prepared Bicentennial information packet. Also located in this building is the Associates' lounge and Commons dining area, where beverages are available from 10 to 4:30 and lunch from 11:15 to 2:15, seven days a week. Associates please note: bring your membership card! If you haven't received one, bring a SMITHSONIAN mailing label with you and a card will be issued at the Associates' desk. For part of July, the Commons may be closed, but the new Associates' Court dining room across the Mall at Natural History will accommodate you. Reservations are not accepted for either facility.

Associates may write ahead for Bicentennial information to Associates' Reception Center, Smithsonian Institution, Washington, D.C. 20560. For more extensive travel information relevant to the original 13 states, write the same address but mark it: "Attention: Museum Reference Service."

"The Federal City: Plans and Realities," an exhibition in the Great Hall, depicts the planning history of Washington, D.C., from the time of Pierre L'Enfant to the still unrealized plans of the Pennsylvania Avenue Development Corporation.

Food and picnic facilities

The Mall, grassy grounds around the museum buildings, and certain areas at the Zoo are fine for picnicking. Bring your own or purchase a box lunch from the stands or mobile carts. (You may sit and contemplate the beauty of the Hirshhorn Sculpture Garden, but please don't eat your picnic there.)

New outdoor eating facilities have opened for the summer. Café Hirshhorn (picture, p. 27) in the fountain courtyard offers box lunches and beverages 10:30 to 5; the Terrace on the Mall side of History and Technology is open 10:30 to 5 (lunches, beverages and good soft ice cream); the Fine Arts and Portrait Gallery cafeteria and courtyard offers sandwiches, vegetarian platters and salads from 11 to 3:30. At the Zoo, the Panda Beer Garden Café on the rooftop of the Panda House is open 10:30 to 5:30, and the Mane Restaurant offers indoor and outdoor dining 9 to 5:30.

Also indoors, a cafeteria and snack area is open in History and Technology 10-8, and in Air and Space (as of July 1) 11-7:30. Opening early June in Natural History is a snack area 10-5 and the new Associates' Court dining room 11-3:30 for lunch and 4:30-8 for dinner. The Commons in the castle is open to Associates 10-4:30 for beverages and 11:15-2:15 for lunch.

And, underground, the National Gallery of Art's new skylighted Café Buffet concourse opens in late June from 10 to 7:30 daily and 12:30 to 7 Sundays for lunch, dinner, beverages and espresso.

Museum hours

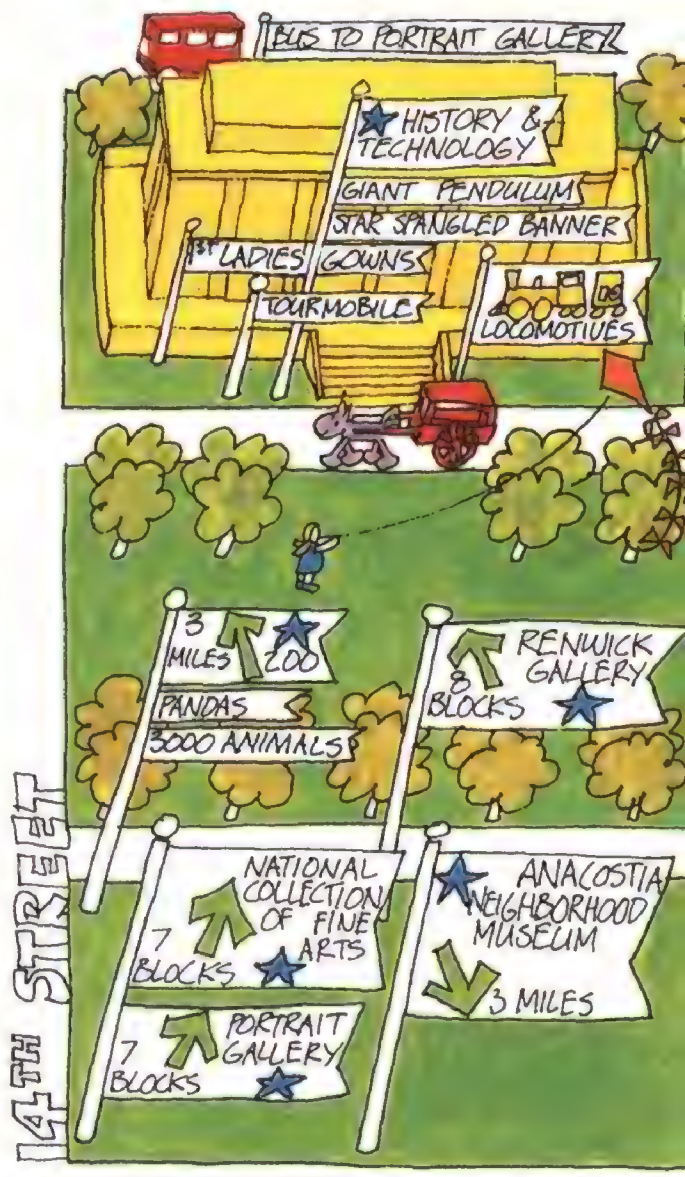
During the summer, the following buildings are open seven days a week from 10 A.M. to 9 P.M.: Smithsonian castle, History and Technology, Natural History, Hirshhorn, Freer, Arts and Industries and Air and Space (public opening July 1). Hours for the Renwick, the National Collection of Fine Arts and the National Portrait Gallery are 10 to 5:30 seven days a week. The National Gallery of Art is open 10 to 9 Monday through Saturday and noon to 9 on Sundays; the Zoo from 9 to 6:30 every day; and the Anacostia Neighborhood Museum 10 to 6 weekdays and 1 to 6 weekends. Note that the hours from 4 to 9 are not only less crowded, but cooler times to visit the Mall museums. Bring a picnic dinner with you or see above for facilities open during dinner hours.

Multilingual facilities

The Museums of History and Technology and Natural History provide information phones in German, French, Spanish, Japanese and Italian. The Visitors' Reception Center in the castle offers a multilingual orientation slide show. Official Smithsonian Institution guidebooks are available in German, French, Spanish and Japanese. Natural History offers foreign-language tours with 24-hour advance notice (381-6135), and foreign-language floor plans of most museums are available at Information Desks. For assistance at the Smithsonian, call 381-6264; for general Washington-area information, call 872-8747.

Special education facilities

The Air and Space Museum (opens July 1) provides a barrier-free environment and many other facilities for people with special education needs. For information call 381-4166. In History and Technology, the "Spirit of 76



Discovery Corner" and a touch-a-tour of "We the People" are of interest. Call 381-6707. At Natural History, a map showing touchable museum objects can be obtained at the Information Desks. Call 381-6211. For information about other facilities, call, weekdays, National Portrait Gallery, 381-6347; National Collection of Fine Arts, 381-6541; Hirshhorn, 381-6713 and Arts and Industries, 381-6707. Wheelchairs are available at most museum entrances. A miniature Victorian fragrance garden for the handicapped opens in midsummer between Arts and Industries and the Hirshhorn. For special transportation around the Folklife Festival grounds, check at an information kiosk (see map, pp. 30-31 for locations) upon arrival.

Museum shops

Each museum shop carries items relating to the collections in that museum. Associates are entitled to a ten percent discount with a membership card. (Please note: discount privileges do *not* apply to the National Zoo, the National Gallery of Art and on certain items in the Freer Gallery shop.) Film, flash cubes, Smithsonian and Washington-area guides are available.

The Arts and Industries 1876 shop features items popular 100 years ago. Visitors can have their pictures taken in period costume in the "Tintype Studio." A gazebo features popular plants of the era. Lavender and cucumber soap; costume jewelry; parlor games; Shaker reproductions; the original-style Levi's patented in 1873; and a selection of books on the period are only some of the items available.

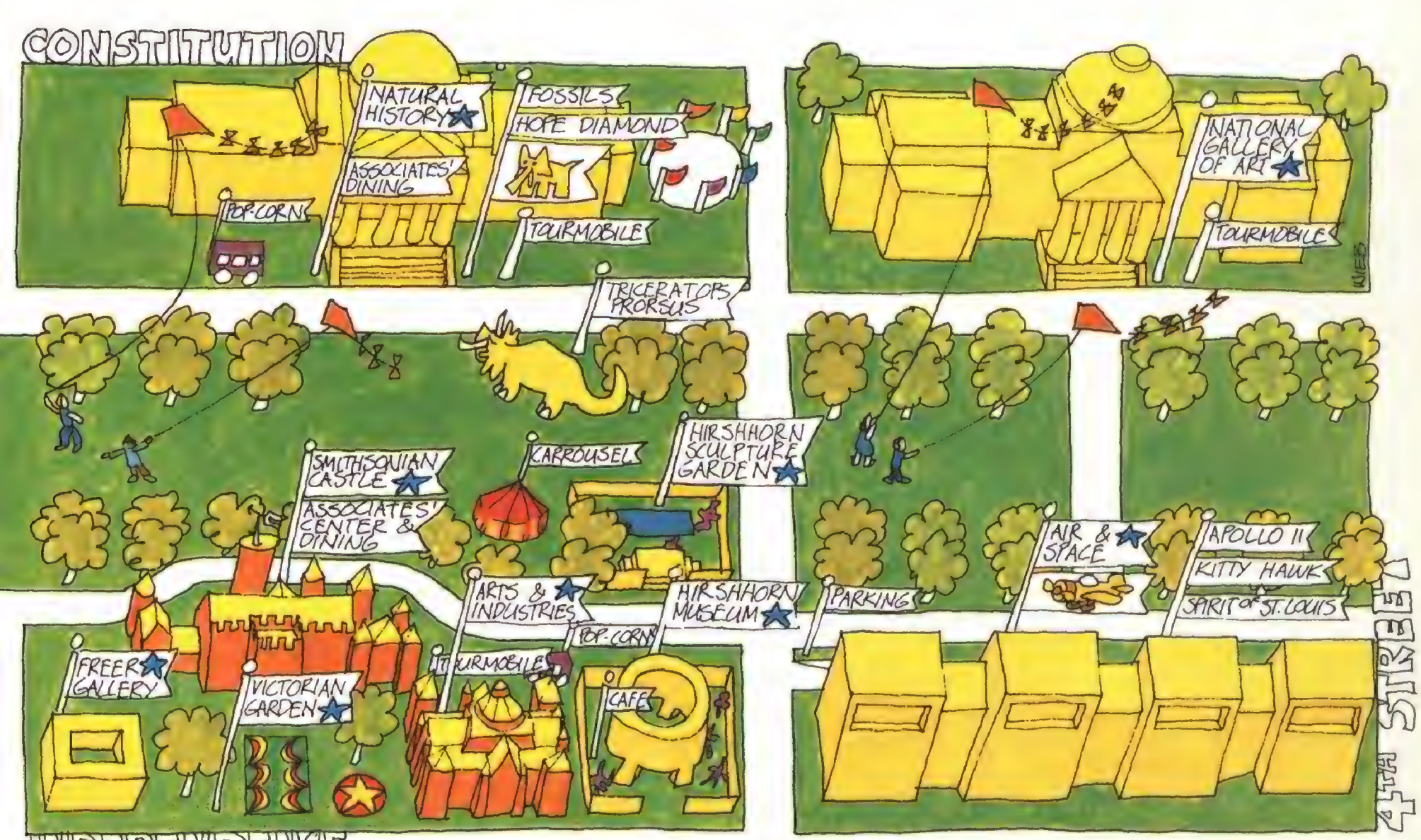
The Air and Space shop (opens July 1) contains one of the largest selections of air and space books, aircraft models and kites in the world. Models from the *Kitty Hawk* to the futuristic *Enterprise,* with hundreds in between; astronaut patches; flyers' wings, helmets and scarves; graphics and reproductions of original art are available.

The Hirshhorn shop carries posters, notecards, contemporary art, jewelry and modern-design canvas totes.

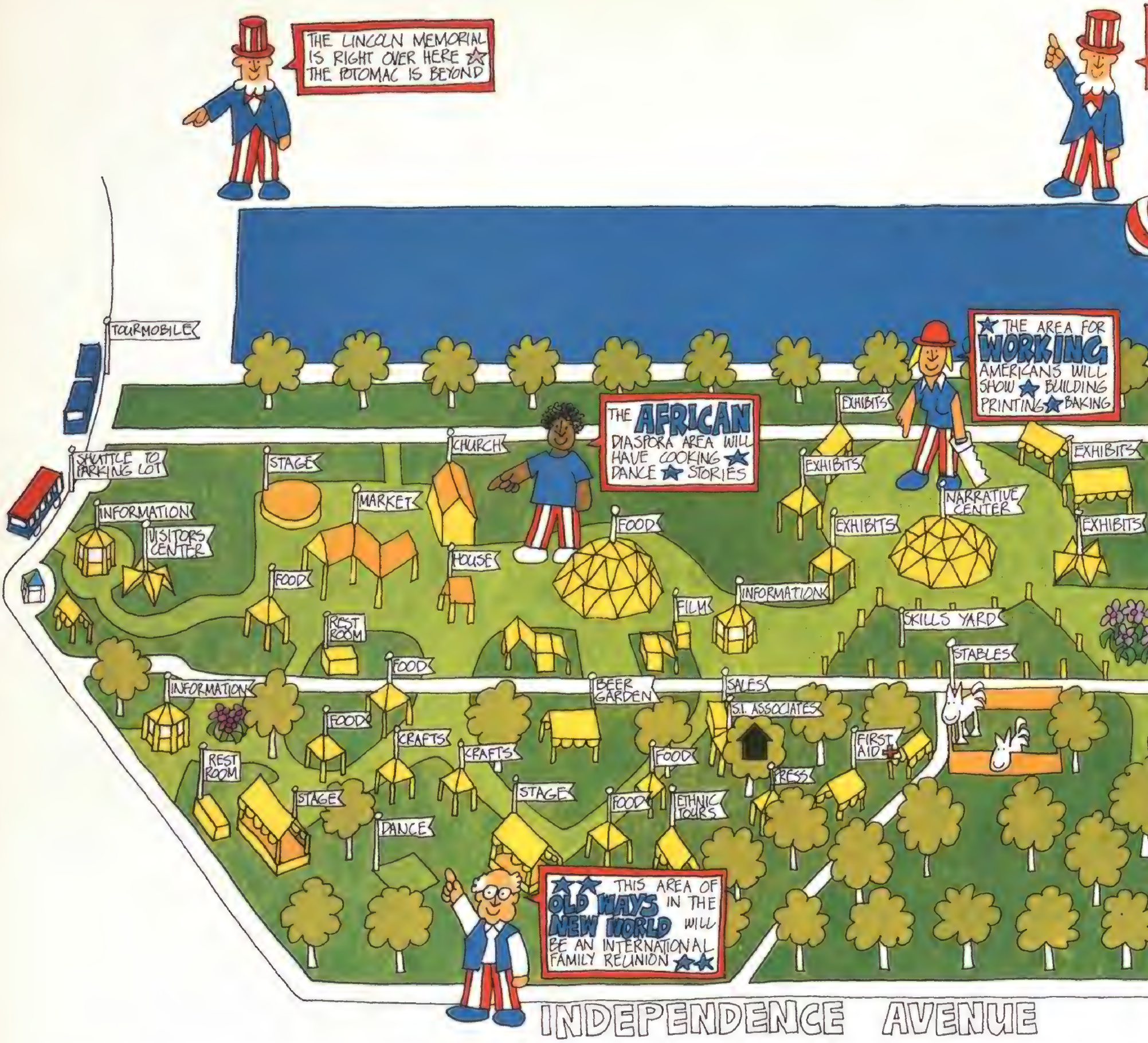
The History and Technology shop has American crafts, china, pewter, flags, dollhouse furniture, and items from "A Nation of Nations" exhibit. The McGraw-Hill Bookstore is located in this museum.

The Natural History shop carries rocks, plants, and crafts from all over the world, such as Indian jewelry, Eskimo carvings and basketware.

The shop in the Renwick Gallery features one of the most extensive collections of craft books in the country. The National Collection of Fine Arts has graphics, notecards, prints and art books. Of special note here is the extraordinary new publication *America as Art.* The shop in the National Portrait Gallery features busts and art and history books relating to figures in the museum's collections. The Freer shop has Oriental needlepoint designs, prints, folders, notecards and books.



Smithsonian Mall: Castles, rockets, dinosaurs and a bit of colorful artistic license. Flags, lower left, show way to museums off the Mall.



Festival of American Folklife

This summer's Folklife Festival celebrates 200 years of America's national heritage with more than 5,000 participating musicians and craftspeople from every corner of the United States and 36 other countries. The festival is a living museum of the vital and continuing folk traditions, arts and skills of America. It runs between the Lincoln Memorial and the Washington Monument, June 16 through September 6. Hours are 11-5 Wednesday through Sunday, with concerts scheduled in the early evenings. Refreshments and native foods can be purchased throughout the festival area.

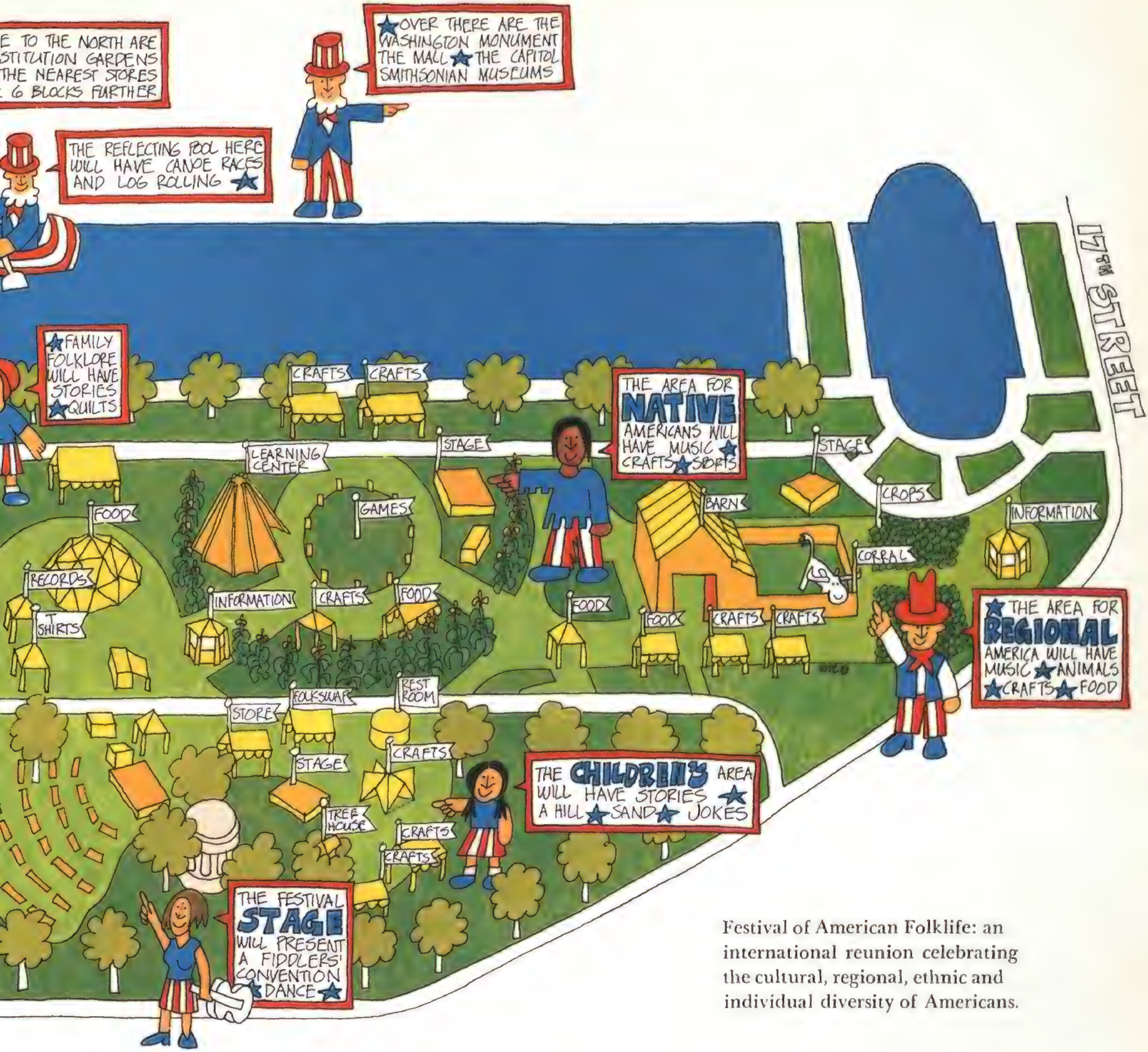
Buses run every few minutes to and from the shuttle parking areas of RFK Stadium, the Pentagon and Fort Myer (see information, p. 27, under "Automobiles"). There is no parking available on the festival grounds.

The "African Diaspora" area presents the cultural experience of black Americans and demonstrates their links to Africa, the Caribbean and Latin America. Musicians, dancers and craftspeople from those three areas are among the performing artists.

"Working Americans" presents workers' lore through song and stories. Everyday job skills are demonstrated by bakers, builders, printers and clothiers.

"Old Ways in the New World" brings the sons and daughters of those who emigrated to the United States together with their cultural cousins who stayed at home. Participants from 24 foreign countries join Americans of like origin for an international family reunion on the Mall.

"Native Americans" features continuing traditions of the first Americans through music, dance, cooking, crafts and sports. The Iroquois demonstrate lacrosse; Cherokee participate



Festival of American Folklife: an international reunion celebrating the cultural, regional, ethnic and individual diversity of Americans.

in a stick-ball tournament; Tlingit and Chippewa race canoes in the Reflecting Pool. Buffalo barbecues and salmon bakes are held in this area, and fry bread, piki bread and mint tea are other native foods available.

"Regional America" features about 100 participants each week presenting music and craft traditions from specific regions of the country. Included are a timber carnival from the Northwest, birch-bark canoe building from the Great Lakes, ranching from the Midwest and Rockies, and leatherworking and cowboy skills from the Southwest. Ways of maritime life in New England and coal-mining life in the upland South are portrayed. Some of the regional foods prepared in this area are barbecued beef, beanhole beans and Gulf Coast seafood.

"The Children's Area" celebrates the folklife of young people. Ring games, sand castle building, crafts, jokes and a treehouse can be shared by young and old alike.

The "Family Folklore Center" invites visitors to recount the stories, legends and ways of celebrating that constitute their own folklore. Quilts, ribbons, bottles, picture albums and other souvenirs that families save for remembrance are on exhibit there.

For other highlights, detailed information and performance times, consult the program booklet published by the National Park Service and the Smithsonian's Division of Performing Arts. It is available at all festival information kiosks. Also watch Washington newspapers for daily festival events. Don't forget that summers in Washington are hot and humid; this is an outdoor event with no air-conditioned areas, so dress accordingly. Associates may obtain information from their own tent (see arrow, p. 30).

Freer Gallery of Art

"Arts of Asia at the Time of American Independence" presents Near and Far Eastern art from the period of the American Revolution. All works by American artists have been removed from the galleries, with the exception of Whistler's Peacock Room.

Arts and Industries Building

"1876: A Centennial Exhibition" (see cover story, May issue) re-creates the atmosphere of America during the time of the Philadelphia International Exposition of 1876. More than 25,000 objects are exhibited in the completely restored building.

On the west side of the building, the Victorian Garden is landscaped in the style of the gardens outside the 1876 exposition's Horticultural Hall.

"The Grand Centennial Puppet Show" (see picture, opposite) is an adaptation of an elaborate show performed at the 1876 exposition. It is presented by the Nicolo Marionettes in a miniature Victorian theater, Wednesdays through Sundays at 10:30, 1 and 2:30 P.M. Tickets are available through the box office in the A & I Building (381-5395).

"America's First Birthday," a 28-minute film about the Philadelphia Centennial, is shown in History and Technology's Carmichael Auditorium. And, in a related art exhibition, works from the Centennial are shown at the National Collection of Fine Arts.

Hirshhorn Museum and Sculpture Garden

"The Golden Door: Artist-Immigrants of America, 1876-1976" (p. 92, May SMITHSONIAN and, for opening of museum, December 1974 and January 1975 issues) assesses the role of the foreign-born artist in American art during the past century.

Twenty Bicentennial banners by widely known contemporary artists are hung in the fountain court.

Air and Space Museum

The new museum (p. 44) will not open as a whole until July 1, but the *Spirit of St. Louis, Apollo 11, Kitty Hawk* and other historical aircraft in the Milestones of Flight Gallery may be viewed from the Independence Avenue lobby. (The lobby may be closed from time to time for construction work.) Once the museum opens, the Albert Einstein Spacearium (pp. 54-55) will present 45-minute shows; NASM Theater will show a film lasting 25 minutes. And, of special interest to *Star Trek* fans, is the original studio model of the *Enterprise* on view in the "Life in the Universe" exhibit.

National Gallery of Art

Based on the life of the third President of the United States, the visual arts of his day and his own highly enthusiastic interest in them, "The Eye of Thomas Jefferson" (p. 88) includes more than 550 paintings, sculpture, drawings, prints, books, decorative objects, architectural models and horticultural material. The National Gallery is administered under a separate Board of Trustees from other Smithsonian museums. For information, check the Gallery's Constitution Avenue reception desk or call 737-4215.

Museum of Natural History

"Our Changing Land" is the largest exhibition hall in the Museum. The new area shows in four, full-sized habitat settings how environmental change over the past 10,000 years has affected a small area on the banks of the Potomac River. Free films are shown in the Ecology Theater from 2 to 3 P.M. weekdays.

A renovated Hall of Lunar Geology (opens mid-June) takes a look at "Moon Rocks" from a scientific, down-to-earth point of view.

The Insect Zoo is being renovated, but when it reopens in late August visitors can observe live ants, cockroaches, termites, scorpions and other creeping, crawling, flying delights in natural, environmental settings.

The second Associates' dining room and reception desk opens in early June. It is located in the West Court.

Museum of History and Technology

A major Bicentennial exhibition, "A Nation of Nations," opens June 9. It includes more than 6,000 of the nation's most valuable treasures, many exhibited for the first time. Scholars, curators and designers have been working on this project for five years. It explains in four theme areas how people from every part of the world came to America ("People for a New Nation"); the richness and diversity of the cultures they brought with them ("Old Ways in a New Nation"); the shared experiences which bonded them together ("Shared Experiences"); and the improved technologies that linked them to the rest of the world ("A Nation among Nations").

A raised walkway carries the visitor through an acre of exhibit area where an operating pencil-making machine demonstrates the principles of mass production; two theaters present multimedia programs related to the sports and entertainment section of the exhibit; and a working ham radio station demonstrates instantaneous communications between the Smithsonian and radio operators throughout the world.

In other areas, "We the People," in the newly constructed Hall of Political History, presents the history of American government through three lively, comprehensive themes. "American Banking" follows the 200-year history of banking from Colonial barter to electronic banking systems of today; and "Suiting Everyone" (p. 84, September 1974 issue) is a multidisciplinary exhibit tracing the 200-year history of American clothing from Colonial times to the changes brought about by the Industrial Revolution.

National Portrait Gallery

8th and F Sts., N.W. A free double-decker shuttle bus (see map, p. 28) runs between the Constitution Avenue entrance of History and Technology and the Fine Arts and Portrait Gallery, 10:30 A.M. to 5 P.M. daily.

A major Bicentennial exhibition based on Daniel J. Boorstin's Pulitzer Prize-winning book *The Americans: The Democratic Experience* presents the portraits, diaries and patent models of the men and women who revolutionized America in the decades following the Civil War. The exhibition is mounted on the third floor, closed since the disastrous fire in 1877 and

Nicolo, the three-foot-tall master of ceremonies, dances through "The Grand Centennial Puppet Show" in the Arts and Industries Building.

now restored to its Victorian Renaissance decor of patterned stone, marble, tile, colored glass decorations and relief panels (p. 120, January issue).

"Abroad in America: Visitors to the New Nation, 1776-1914" documents the reactions of visitors to the new country through portraits, landscapes, maps, diaries and photographs.

"Christian Gullager: Portrait Painter to Federal America" presents the works of a somewhat-neglected Danish-born artist who painted George Washington and other distinguished Americans and patriotic symbols.

"Keep the Last Bullet for Yourself: The Fight at Little Big Horn" opens June 25, commemorating the anniversary of Custer's last stand (p. 58). Opening July 13, "Wedgwood Medal Portrait Medallions of the Revolutionary Period" presents 40 British and American Wedgwood figures. Finally, "The Spirit of Fact: The Daguerreotypes of Southworth and Hawes," opening July 17, is an exhibition of 110 daguerreotypes from the most prestigious photographic salon of the period.

National Collection of Fine Arts

9th & G Sts., N.W. See transportation information under Portrait Gallery. The museums are in the same building.

"America as Art" is a monumental Bicentennial show of 388 paintings, drawings, prints and sculpture divided into eight chronologically arranged areas. It illustrates how American art has been identified with the changing concepts and ideals associated with the United States over the past 200 years. One special aspect of the exhibition is "A Family Treasure Hunt," available at the Information Desk. This innovative guide teaches children to look at American art and history in an exciting and challenging way. It is a learning experience you won't forget. And, it's fun!

A loan exhibition of miniature portraits, illustrating the evolution of the American miniature from the Colonial period to the time of the Civil War, opens June 25. A number of outstanding works by Edward Greene Malbone and the Peale family are shown publicly for the first time.

"1876: American Art of the Centennial" is a selection of paintings and sculpture from the American art section of the Philadelphia Centennial.

A new gallery of items from the John Gellatly collection opens June 4, featuring 16th-century Renaissance jewels and Chinese glass, 13th- and 14th-century ivories and alabaster, and a diamond-studded, gold-enameled box owned by Catherine the Great.

Renwick Gallery

1661 Pennsylvania Avenue, N.W. Metro buses 30, 32, 34 or 36 can be caught on 7th Street by the Air and Space Museum and taken to 17th and Pennsylvania Avenue N.W.

"Signs of Life: Symbols in the American City" fills the first floor of the Gallery. The uniquely designed exhibition examines the origin, evolution and meaning of symbols that have become distinctively American in the home, on the commercial strip and in the 19-century city.

Anacostia Neighborhood Museum

2405 Martin Luther King Avenue, S.E. Buses A2, A4 or A8 can be caught on 4th Street, near Air and Space, and taken to the museum.

"Black Women: Achievements Against the Odds" examines, in ten theme areas, the roles, contributions and achievements of 150 black women in America from Colonial times to the present.

National Zoological Park

3000 Connecticut Avenue, N.W. To get there, take an L2, L4 or L6 bus from 13th and Pennsylvania Avenue N.W. (near History and Technology).

The National Zoo has undergone extensive renovation over the last several years. The William M. Mann Memorial facility, a spectacular amphitheater exhibit for lions and tigers is open; the renovated elephant house and yards are completed; the waterfowl and crane exhibit areas surrounding the birdhouse are stocked. (The new birdhouse will not open until fall.) New park furniture is being installed and bright graphics (see picture, right) provide orientation and directional information.

Tours and demonstrations

Most Smithsonian museums, with the exception of the National Collection of Fine Arts and the National Portrait Gallery, have canceled public tours for the summer months. Instead, museum docents and roving information volunteers, identifiable by yellow sashes, badges or costume, are available to answer questions. Departments at some museums present scheduled, live demonstrations. Check desks at each museum for current information.

For children

There are many areas of special interest to children, but space to mention only a few: Spacearium and film theater in Air and Space (opens July 1); Puppet Theater and Tintype Studio in Arts and Industries; Discovery Corners in History and Technology; Explore Gallery and America as Art Treasure Hunt in NCFA; Discovery Room at Natural History; and the carrousel on the Mall.

Traveling Exhibition Service

For Associates not coming to Washington, the Smithsonian is circulating Bicentennial shows to hundreds of cities. For a listing, write: SITES, Smithsonian Institution, Washington, D.C. 20560 or call 381-6631.

Important odds and ends

Health units are located in History and Technology, Natural History, Air and Space and the Hirshhorn. Strollers are not allowed in the Hirshhorn (backpack carriers provided). Handheld cameras can be used, but no flash bulbs are allowed in art museums. Public restrooms are on every floor in each building except the Hirshhorn (on lower level only). Telephone number for Associates and visitor information is 381-6264; dial-a-museum, for recorded daily events, is 737-8811. And, finally, SMITHSONIAN's deadline is early, so hours or dates may change slightly after we have gone to press.

MEREDITH WHITE RIEGLE

Information totem, rising 16 feet on Zoo trail, points way to exhibits.

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Because it uses this natural heat, the Fedders heat pump air conditioner can achieve dramatic savings in winter fuel bills when compared to straight electric heat. Electric heat has a C.O.P.* of 1.0 and provides 3413 BTUs of heat per kilowatt hour. Fedders Flexhermetic II model CKH024B7A outdoor unit and CFJ024CQA indoor unit provide a C.O.P. of 2.6 at 47°F outdoor temperature or 8874 BTUs of heat per kilowatt hour. It is easy to see how savings can quickly add up to offset the low operating cost of Flexhermetic II heat pump cooling.

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*C.O.P. stands for Coefficient of Performance, the ratio of heat output to energy consumed.

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Rijksmuseum, Amsterdam

Photographed the day after the attack, a section of painting reveals wounds: knife slashes or scratches.

A triangular piece between Captain Banning Cocq's legs (left) has fallen completely out of the canvas.

By Maureen Green

The Night Watch is now restored to glowing health

Rembrandt's masterpiece, almost fatally damaged by a deranged man last fall, may be seen once again in its full glory

When Captain Frans Banning Cocq picked Rembrandt van Rijn to paint a group portrait of his militia company, he may have hoped to get something a little more remarkable than the tactful lineup of worthy citizens all-in-a-row that other painters usually depicted. Rembrandt, in any case, could be relied on to go to the heart of the matter. The master painter had lived on the same street as the civic guard headquarters, and had probably seen the motley volunteer militia assembling many times. From such recollections, he chose to present Banning Cocq's company at the moment when the captain steps forward and gives his lieutenant the order to march; when the drummer sounds a roll, musketeers load and shoot, and the ensign holds aloft the company colors.

That Captain Banning Cocq and his volunteers were satisfied if amazed to be part of this celestial expedition seems certain, since they paid up the 1,600 guilders (perhaps $7,000 today) they had promised after the completion of the picture in 1642—those in

A layer of rice paper and glue was used to protect the surface of the painting while it lay face down on the floor during repairs to the back. Here, some of the whitish sludge has been removed with solvents.

Photographs by Ruud Hoff

Close-up, after initial repairs, of the worst damage includes (top center) tip of piece that fell out.

the foreground paying a little more, and those partly concealed in the shadows a little less. And the verdict of history on Rembrandt's largest work, which came to be known affectionately, if inaccurately, during the 18th century as *The Night Watch,* has been one of fascinated acclaim. Art historian Jakob Rosenberg writes that "Rembrandt's extraordinary treatment has raised this rather trivial occasion to a spectacle of unforgettable pictorial glamour."

But *The Night Watch* is not only one of Rembrandt's greatest canvases; it is also one of his unluckiest. When it was first hung in the banqueting hall of the Kloveniersdoelen (the Guildhall of the Shooting Companies), it was given a position next to the fireplace, where it picked up enough soot and discoloration to justify its later nocturnal nickname. In 1715 all the militia company portraits were shifted to the Town Hall of Amsterdam, but the size of Rembrandt's picture posed problems; to make it fit in between two doors, it was cut down on all four sides to its present size, roughly 12 by 14½ feet. The greatest loss was on the left side, where two entire figures were lopped off; and, as an early copy makes clear, the cropping mars the whole composition, making it more symmetrical than Rembrandt ever intended.

The picture's fame first attracted the knife of a maniac in 1911. Only the tough varnish of the centuries protected the canvas: the painting was scratched but not cut. The first modern reappraisal and restoration was not undertaken until 1946-47: layers of dirt and varnish were removed, including a tough layer of copaiba balsam which had been brushed over the surface of the picture to bring out the faded patches, but which was seen to be pulling the paint apart; the figure of the boy "powder monkey" in the left-hand corner had almost disappeared. Finally, on September 14, 1975, the picture once more attracted a madman's knife. In the few seconds before a Rijksmuseum guard managed to pin him down, a Dutch mental patient (who has since committed suicide) inserted 12 slashes and scratches into the paint and canvas of *The Night Watch.*

"When the director-general phoned me and said 'Someone has attacked *The Night Watch,*' I drove in thinking that I would see a small cut," recalls Luitsen Kuiper, the tall, 40-year-old chief restorer at the Rijksmuseum. "When I saw the picture, I groaned. I kept thinking of the amount of work involved. It was not only the size of the long cuts and scratches. One triangular piece of canvas, about 11 inches long, had fallen out altogether. I put it in my desk for a day, while I worked out what to do."

In fact, the Rijksmuseum reacted with speed to this onslaught on the picture which stands as the climax to its renowned collection of Dutch 17th-century masters. Kuiper's immediate worry was that the cut edges of the canvas would sag and stretch, and therefore prove difficult to replace later; so the day after the attack a brisk first-aid treatment was given. The missing triangle was replaced and the other cuts fixed flat by applying transparent tape to the back of the canvas. A day later, these two most damaged areas were strengthened on the front of the picture with an application of Japanese rice paper and glue. At this point the painting appeared to be wearing Band-Aids.

Maureen Green, whose articles appear frequently in SMITHSONIAN, *kept a close check on the progress of the restoration from her home base in London.*

The same area, but on the back side of the canvas, shows how cuts were bridged with linen fibers.

After repairs and retouching, flicker of red sash again brightens area between captain's striding legs.

The Rijksmuseum staff quickly came to two conclusions. The picture was much too large to be moved up to their usual restoration studio on the top floor of the museum, and the damage to the painting was so widespread as to demand that the picture be restored as a whole, which would take several months. The directors of the museum made an unprecedented decision. A restoration studio should be built around the painting, in the very room where it had always hung, and the public—over a million of whom trek past the great canvas every year—should not be excluded from seeing the picture, even while in its invalid condition.

In the week after the attack, two-thirds of *The Night Watch* gallery was divided off by a wall topped by five large windows. Inside this enclave, an air-conditioning system restricted humidity to 60 percent and controlled temperature at 66 degrees Fahrenheit. Curtains over the wide windows allowed the seven-man team of restorers to concentrate on their work undisturbed, but at every break for coffee or stop to chat with the numerous visitors from press and television, the curtains were drawn back and the public could check on the progress. Greeting them over the windows were signs in Dutch and English explaining, "Don't worry. All will be well."

Planning the entire process of restoration, recalled Kuiper, was the moment of greatest tension. "The whole emphasis of restoration work has changed," he explained. "A century ago if the restorer was faced with a painting that had a hole in it, he first thought about the hole and then about the painting; now we think about the painting, and then we think about the hole." *The Night Watch,* Kuiper had already decided, was "very damaged and needed to be restored in its entirety."

After preliminary tests, the Rijksmuseum decided that the job was basically a clear-cut one and did not require an international panel of advisers and assistants; they could handle it on their own, with scientific backup from Amsterdam's Central Research Laboratory. The problems were much the same as they had faced with other 17th-century pictures; this time there were simply more of them, since the painting was so vast. The heaviest burden was the sensation that the whole world was peering over their shoulders, sometimes quite literally sending up the temperature. On the day that Princess Beatrix of the Netherlands brought her friend the Queen of Denmark to visit the restoration studio, the 60-strong royal entourage had to be persuaded to stay outside the glass windows, since their combined breath and body warmth would have wrecked the carefully controlled atmosphere.

Once the painting was face down on the floor, its priceless surface protected with a covering of thin ultra-absorbent rice paper and cellulose glue, Kuiper and his six assistants removed the 1947 lining. The team then set about repairing the cuts using a method developed in Belgium, but tried only a few times before in the Netherlands. Each cut was bridged on the back of the canvas with many small linen fibers which were stuck across the old canvas with glue (above) . When this had set, surplus fiber was shaved away so that the patch would be as thin and unobtrusive as

possible. "If you rely on early methods of repair, the cuts can show again later. Because the fiber of the canvas is broken, the air opens up the old scar," said Kuiper. "But a bridge of linen pieces won't show even 20 or 30 years later." Once the cuts were mended, a new lining was lowered onto the back of the Rembrandt canvas and a mixture of beeswax and resin poured on; the relining was ironed into place with heavy old-fashioned flatirons. A mere six weeks after the attack, the chief restorer was able to say confidently, "It's a very simple case. The only surprise that we have had is that the difficulties which could have arisen did not happen."

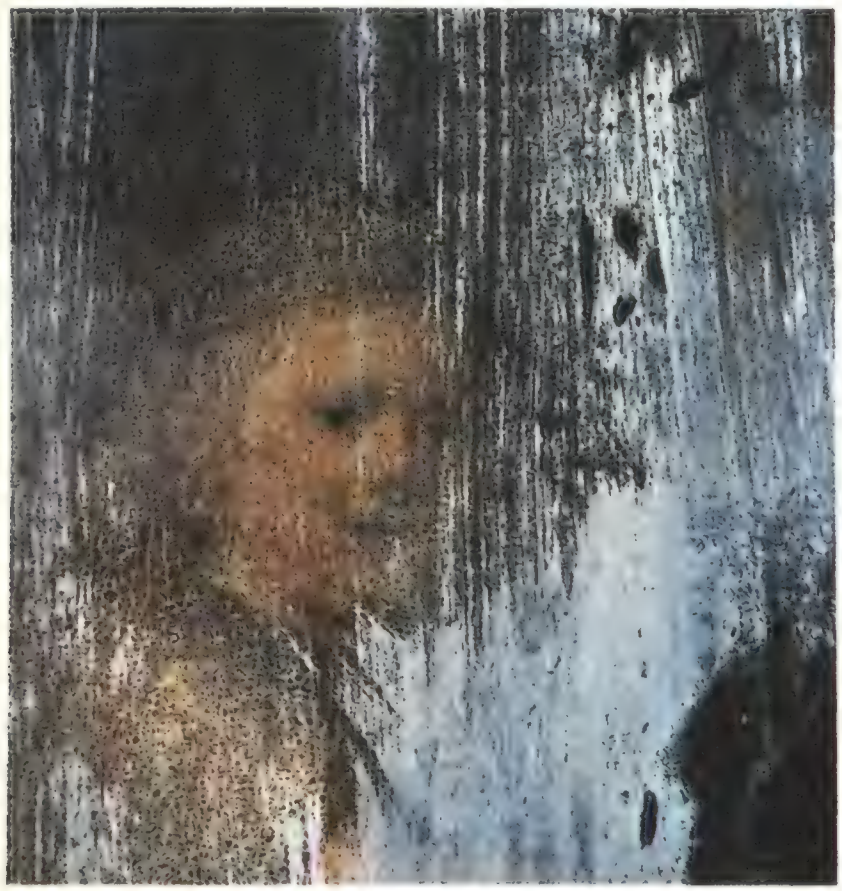
Triumphantly, *The Night Watch* was turned over, the top protective layer of paper ripped off, and the painting stood upright once again for all the world to see. Or rather, not see. While Luitsen Kuiper and his assistants were contentedly examining the front of the canvas to assure themselves once more that the repairs to the cuts could not be detected, laymen stared in some perplexity. The painting was still covered by a couple of millimeters of thick creamy substance, the residue of the glue and rice paper. Beneath the whitish sludge could be detected certain vague martial shapes, and the face of a young girl smiling bravely through (below). But what could mainly be seen was the *craquelure,* tiny cracks in the varnish layers.

Yet what the restorers had put on they could take off. And, sure enough, the painting was still there under the glue, as Kuiper demonstrated in wiping it off with alcohol from a small patch around Banning Cocq's boot. The picture was now ready for the several complex processes of cleaning.

Several layers had been pinpointed for removal. Firstly the thick glue residue, a straightforward job. Next the 1947 varnish, a good varnish but subject to all the atmospheric deterioration of any object that is sighed over from a million pairs of lungs each year, or frequently surrounded by groups of wet raincoats. Then, odds and ends of older varnish that Kuiper had established to be in existence in some parts of the picture. In earlier generations restorers were cautious about removing varnish over dark areas, of which *The Night Watch* has many, because dark browns and blacks were known to be extremely vulnerable and their depth easily destroyed.

Choosing his words carefully, since this is one of the most controversial aspects of modern restoration, Luitsen Kuiper confidently claimed, "Removal of this old varnish is very important. In this case, the 1947 varnish has oxidized and yellowed, and there are patches of much older varnish and some old retouching that will come away." Refusing to be unnerved by the suggestion that some of the original paint might come away, Kuiper joked: "The picture will look lighter and nicer. It will be more of a *Day Watch.*"

After working his way across the surface of the



Girl is dimly seen through coating of rice paper and glue, which emphasizes surface cracks.

At this stage painting has been cleaned and is being given its first layer of new varnish.

picture to remove all unwanted matter, Luitsen Kuiper discovered two new areas of earlier repainting that made him pause. In the patch of fluttering pink behind Lieutenant van Ruytenburch's right shoulder, and in the left-hand section of Banning Cocq's lace collar, overpainting was detected that Kuiper was able to test and date as early 18th century. The habit artists had of working on each other's pictures and repairing or repainting bits, which lasted for a century after Rembrandt, was accepted at the time; our modern point of view, which wants the Rembrandt paint and nothing but, is more purist than the artist himself would have been. "The arguments for doing nothing are great," one art historian summarized. The museum decided that nothing was precisely what they would do.

Otherwise, the varnish removal presented few problems. "We took off the 1947 varnish with chemical solvents, but there was a lot of even older varnish in the *craquelure* of the paint itself," explained Luitsen Kuiper. "We used a yellow neutralizer—oil of turpentine—to see if we could soften this old varnish layer, and bit by bit it came away." The entire surface of the painting was then treated with different kinds of turpentine to produce, Kuiper said, "an even glimmer. When a painting is going to be revarnished, it needs to be very equal in its reflecting power."

One more process was necessary before *The Night Watch* could receive its first layer of permanent new

And now girl's face shines forth clearly once more; this area was not damaged, needed only cleaning.

The face of Banning Cocq requires some retouching from the hand of chief restorer Luitsen Kuiper.

varnish, and then face up to the final task of retouching. Although the canvas had been repaired along the scratches and cuts, a small trough of paint and ground had been scooped out by the knife of the attacker. To even up the surface of the picture, a new ground would have to be puttied in—a mixture of chalk and glue, tinted to a smudgy brown similar to that of the original Rembrandt ground. Then a new layer of varnish was applied in a fast 25 minutes. Two days later, Kuiper said: "The worst is over; the final retouching is fairly routine."

Routine or not to the restorer, retouching arouses the greatest alarm in the layman's mind. It is at this point that many begin to fear that the painting they loved may never look the same again. Modern restorers, themselves aghast at the prettying-up jobs of past centuries and aware that their efforts may not be appreciated by future generations, move with caution and build into their work escape routes for posterity. "In modern restoration, everything must be reversible," says the Rijksmuseum's chief restorer. "The next generation can think again and redo the whole thing if they so wish." For this reason, restorers do not search for traditional oil colors that would blend in with Rembrandt's paint in such a way as to deceive even the most expert eye; they use instead modern industrial paints that any specialist would recognize instantly on close examination. And, in the case of *The Night Watch,* every stroke from the retoucher's brush is applied on top of the first varnish, and can be wiped

away at some future date without delving down again to the original paint.

Picking up his palette and brushes, Kuiper embarked on the retouching which he alone would do. Since the difficult job of mixing and matching colors could only proceed by daylight, progress was slow; Amsterdam's February grayness only lifted sufficiently for two or three hours' work at midday. Generally, in retouching smaller 17th-century pictures, Kuiper uses egg tempera, which does not darken, to begin with, followed by oil paint applied directly onto a layer of wet varnish. However, on a picture the size of *The Night Watch,* egg tempera would be wholly impractical; the varnish layer would have dried before the restorer had completed his task. So Kuiper chose instead oil paints.

"Rembrandt used very few colors," Kuiper said. "Some say only six, some say ten. But for the job of matching up, I have needed to use more." The retouching completed, the entire canvas received one final layer of varnish on May 4 and, after allowing a month for drying, was ready for unveiling to close and curious public scrutiny. At the end of six months' work, and a cost of 100,000 guilders ($37,300), *The Night Watch* had once more revived. "Nice, isn't it?" Luitsen Kuiper queried. "The Rembrandt painting could not really be seen half so well before."

Until the beginning of 1977, the thousands who come to visit and check Kuiper's confident judgment will be forced to see *The Night Watch* behind glass. Guided by a desire to protect the top varnish on the picture from any atmospheric alteration until it has had at least eight months to harden, rather than by security fears, the Rijksmuseum has constructed a narrow air-conditioned case to protect their prize attraction. After that, the picture will come out bravely into the air once more.

Once again *The Night Watch* will have the chance to exercise its peculiar fascination. Faced with the great canvas, full of movement, in which not one character in dress, weapon or color is remotely like another, visitors may recall the words of Rembrandt's pupil, Samuel van Hoogstraaten: "It will outlive all its competitors. . . ." He had only one word of criticism: "I should have wished him to introduce a little more light." If Hoogstraaten were to walk into the Rijksmuseum today, he might feel that his wish had been granted.

Completely restored, company of *The Night Watch* steps out triumphantly once more. After being returned to its frame, painting will spend eight months in an air-conditioned case while varnish dries.

By Edwards Park

New Smithsonian museum records Man's thrilling affair with flight

Photographs by Barry Blackman, Lee Boltin, Robert Lautman and Day Walters

National Air and Space Museum takes visitors from the long dream of magically leaving Earth's surface through all of the brief reality

The building stretches for three full blocks along Independence Avenue in Washington, D.C. Thanks to its marble walls, a match for the National Gallery of Art across the Mall, its modernity does not intrude abrasively. But the Smithsonian's brand-new National Air and Space Museum is so modern, so much a celebration of the age of flight, that it is hard to imagine it haunted.

Ghosts rustle and whisper here, nevertheless. Open the front door—the entrance to the great central hall, facing the Mall—and here they all are: Orville and Wilbur Wright, Charles A. Lindbergh, Dr. Robert H. Goddard (SMITHSONIAN, June 1970; May 1976; March 1976); Professor Samuel P. Langley, former Secretary of the Smithsonian; and, although not the ghosts, certainly a bit of the spirit of brave pilots and astronauts who wrote history: in the X-1, first aircraft to surpass the speed of sound; the X-15, first to go six times the speed of sound; the Mercury spacecraft, in which John Glenn became the first American to orbit the Earth; Gemini IV, from which Ed White made the first American space walk; and Apollo 11, which took Man to the moon. The devices come together in this entrance hall, called the Milestones of Flight. The Wrights' *Flyer* seems to sail right at you at about the height it maintained at Kitty Hawk for 12 momentous seconds, 73 years ago. And on the carpeted floor beneath it stands Apollo 11, 66 years younger and seeming a thousand years wiser.

Apollo's commander, who stayed with the spacecraft

Main entrance to Milestones of Flight confronts visitors with Wrights' *Flyer,* behind it Lindbergh's *Spirit of St. Louis,* and on the floor, Apollo 11. The X-15 is in foreground, meeting the X-1 at right.

Wiley Post's early space suit sits beside *Winnie Mae*, breaker of many 1930s records.

Marble and glass alternate in three-block-long Air and Space Museum, which fills the area

and orbited the moon while Neil Armstrong and Edwin Aldrin made their "giant step," was Michael Collins, now director of this museum. He supervises an unmatched collection of the devices that have taken Man off the surface of his planet. And the building in which they are housed is one of the most remarkable of recent architectural achievements.

Thirty years in the planning and dreaming, four years in the building, the National Air and Space Museum can possibly be called the finest building of its kind ever erected. It is pretty safe to call it unique. And there is no quibble with calling it extraordinary. With huge display areas and an extensive use of glass, the museum presents its exhibits as though they were in their natural element. Many of the air- and spacecraft seem to fly in midair. Look out, beyond them, and you see open space, the grass and trees of Washington's Mall. Look up, and there is the sky itself.

On the ground floor, a broad concourse links three major halls, each 62 feet high and with a ground area more than three times the size of a basketball court. These are roofed with multiple domes of glass specially tinted to filter out damaging ultraviolet rays. The front walls—facing the Mall—are glass also.

between the Mall and Independence Avenue (left).
The round Hirshhorn Museum stands beyond it.

The two great halls flanking the Milestones of Flight are devoted to air transportation and space. The former is rich with nostalgia for the good old days of open cockpit mail planes in which the pilot in helmet and goggles followed the railroad tracks from one town to the next; the days of primitive airliners in which daredevil passengers tasted adventure by strapping themselves into fragile seats on a sharply sloping floor and putting their faith in God, Pratt and Whitney, in that order. A DC-3 of Eastern Airlines' "Great Silver Fleet" hangs here, a prime example of the most famous and durable airliner the world has known, seemingly indestructible, dependable in peace, gallant in war, still in use around the world.

The DC-3 weighs some eight tons, so how is it hung from a ceiling that lacks columns and props cluttering up the open space? The answer: tubular steel trusses, triangular in cross section, spanning the ceiling and supported by pylons of the same construction. This technique, appropriately similar to that used in aircraft construction, bears the weight. Yet the trusswork is open and so unobtrusive that the halls remain visually airy and the aircraft seem to hang magically within them.

Director Michael Collins stands beside
Apollo docking craft that joined Soviet Soyuz.

New Air and Space Museum

The largest item in the museum stands in Space Hall, the third of the great halls. This is the Skylab Orbital Workshop, a massive cylinder covered in gold foil. One of its solar panels stands beside it, a great rectangle containing some 150,000 solar cells. You can enter the Skylab from the balcony and picture yourself living and working here for a month or two while in orbit around the Earth.

Nearby, on the floor, stand an Apollo spacecraft and a Soviet Soyuz spacecraft, twins to those in which astronauts and cosmonauts met and shook hands in space last year.

Rocketry commands your attention in Space Hall, since four great monsters soar upward to the ceiling from a 15-foot pit specially excavated in the floor to receive them and to let them fit under the roof. Among rockets, these are relatively small. The Saturn V that hurled Apollo spacecraft toward the moon was four times as tall. It is hard to believe that such giants are the progeny of Dr. Goddard's little devices, and also of the tiny air-to-air missiles developed by the Germans during World War II and now hanging above the balcony over Space Hall.

One of the fascinating craft here is called a lifting body. It's a wingless aircraft with a thick, vaguely deltoid shape, not unlike a fat paper dart. This was designed to explore the possibilities of the shuttle, the craft that will be blasted into orbit with rocket boosters attached and then, on its own, will be able to reenter the atmosphere and slow down enough to come in for a more or less conventional landing.

This particular test craft, the M2-F3, has been rebuilt from the wreckage of an unsuccessful test flight during which it skidded all over the landscape. A film of its spectacular crackup is now used as a background sequence for the opening frames of the popular television adventure, *The Six Million Dollar Man.*

Battery-powered lunar roving vehicle, used by Apollo 15 astronauts, stands in the Apollo gallery.

It is notable that the actual pilot of the lifting body, far from being remade into a "Bionic Man," suffered only relatively minor injuries.

So much is packed into the three great halls that many visitors could usefully spend the entire day exploring all they have to offer. Yet around them, on both floors, are 17 special galleries and two exhibition areas at the ends of the building. Here are the artifacts that fill out the story of flight. Balloons, for example, are now nearly 200 years old. They are celebrated in a charming second-floor gallery with memories of the Montgolfier brothers whose hot-air balloon rose from the Bois de Boulogne on November 21, 1783, and sailed above Paris with two daring aeronauts aboard, waving to the cheering multitudes—and also putting out occasional fires in the envelope.

Benjamin Franklin watched the ascent. When someone demanded "What good is it?" Franklin supposedly riposted, "Of what use is a newborn babe?"

A puppet show in this gallery tells the hilarious

M2-F3 lifting body, a test vehicle for space shuttle, hangs above the Apollo docking craft.

story of Jean-Pierre Blanchard and Dr. John Jeffries who made it across the English Channel in a hydrogen balloon in 1785. But just barely. Though they jettisoned all their sand ballast, anchors, books, food, clothing and even, unthinkably, their last bottle of brandy, their basket bounced on the waves and when they finally skittered across the shoreline they were clinging, nearly naked, to the shrouds with barely enough *sang-froid* left to accept congratulations.

Airships are represented by a model (for film purposes) of the ill-starred dirigible *Hindenburg*, which burned in 1937 after establishing high standards of aerial luxury. A reconstruction of her control gondola stands nearby.

Aviation took a great stride forward during World War I. A gallery is devoted to the war years. Postwar flight, in the Twenties and Thirties, was a time for setting new records, extending old boundaries. In the Special Exhibits Gallery (the center of the second floor) stands a bulky monoplane in which pilots of the Army Air Service, in May 1923, made the first nonstop transcontinental flight. This plane, the Fokker T-2, took just under 27 hours to fly from Long Island to San Diego.

Only 12 years before, a small Wright biplane named *Vin Fiz* after the soft drink she advertised, made the very first transcontinental flight, but took 48 days. By the time her daring pilot, Cal Rodgers, reached Pasadena from Long Island, she had been rebuilt a few times as pieces of her broke or fell off at each of 70 stops. *Vin Fiz* looks as good as new, now, hanging here.

Here also is a Douglas World Cruiser, a single-engine biplane with a fuselage large enough to walk around in. This is one of three of these aircraft which were the first to circumnavigate the world, taking 175 days in 1924. Nine years later, Wiley Post flew his Lockheed Vega, *Winnie Mae*, around the world in seven days, 18 hours and 49 minutes.

Winnie Mae rests now in the museum's Flight Testing Gallery on the first floor. Beside it is displayed the pressure suit (p.46) Post designed and had made for high altitude flights. It may seem an awkward piece of tailoring compared to what today's astronauts wear, but the modern creations owe a great deal to it.

Wearing his suit, with its cylindrical helmet like a hot-water boiler, Post once had to make a forced landing at Muroc Dry Lake, California. *Winnie Mae* came in so quietly that no one on the ground noticed her. A local storekeeper, working outside, felt a tap on his shoulder, looked around and recoiled in shock from what seemed obviously to be a man from Mars. It was only Wiley Post, looking for someone to help him remove that helmet.

Wonders of Space Hall lured sightseers long before museum was opened, in part, to early visitors.

Maintenance men noted a smeary line on the glass where hands and noses of youngsters had pressed.

Other famous individual planes are scattered in the galleries. In the Air Traffic Control Gallery hangs a red Lockheed Vega in which Amelia Earhart became the first woman to fly the Atlantic solo. A big float plane among the special exhibits is the Lockheed Sirius in which Charles and Anne Lindbergh explored airline routes "north to the Orient."

Another float plane, near the Sirius, is a tiny Curtiss racing plane, the R3C-2, in which Lt. Jimmy Doolittle, already a well-known pilot and years later to achieve great fame as the leader of the first American raid on Tokyo, won the Schneider Trophy for Seaplanes in 1925. Air races were an exciting feature of aviation in those days, along with acrobatics and barnstorming stunts. The Exhibition Flight Gallery recaptures the carnival spirit of a fairground with planes looping and rolling overhead while a wingwalker performs on an old Curtiss "Jenny." One film here shows the dapper maestro of air racing, Col. Roscoe Turner with waxed moustache, self-designed uniform and pet lion, Gilmore. Gilmore, safely stuffed, is on hand yet.

The quest for speed produced, in the mid-Thirties, the Hughes H-1, a sleek and beautiful racer in which the late Howard Hughes smashed existing speed records for land planes. The H-1 was a splendid design achievement with features ahead of its time. It was

This peek inside shows Skylab Orbital Workshop, right, with square solar panel standing beside it.

selected to be exhibited in the Gallery of Flight Technology, where design concepts and their significance in the story of flight are presented.

Despite such a formidable name, this gallery is an essential one to visit. For here, carefully and entertainingly displayed, are many of the problems of flight and many of the answers. Here, by means of wall panels, working models of wind tunnels, a "dancing engine" which splits apart before your eyes to reveal pistons, valves and crankshaft interplaying like the figures in a square dance . . . by means of puppets, films, models and the Hughes plane, you are taken from the flight of seagulls to the concept of the space shuttle and beyond. The gallery is a tour de force, rich with interest for even the most dedicated groundling.

Such technology, burgeoning in the late Thirties, was put to use in World War II. Many famous fighters —the German Focke-Wulf FW 190 and the Japanese Zero as well as the U.S. Navy's Hellcat—owed a great debt to the H-1. Those and other veteran warplanes have their own gallery. Naval aviation is depicted just across from the military with a simulation of a carrier hangar deck in the midst of wartime operations.

Between the two World War II galleries are displayed some notable warplanes, beginning with the world's first, the Wright Military Flyer of 1909. Here

also is an F-86, the jet fighter that won fame in Korea, and a beautiful old P-26, the chunky little "Pea-shooter" built by Boeing in pre-WWII days. It was our first all-metal fighter: low wing, fixed landing gear and an open cockpit for the glamorously goggled and scarfed pilot. Some P-26s saw action in the first days of World War II in the Philippines.

Helicopters began coming into military use toward the end of that conflict. The craft had been developed by Igor Sikorsky in the early Forties, some 400 years after Leonardo daVinci sketched plans for the concept of vertical lift from rotor blades. In the Vertical Flight Gallery the steps in their development are displayed, and here, too, you renew acquaintance with the auto-giro, that simple and inexpensive craft of the Thirties, designed on the principle that forward motion imparts a rotary motion to freewheeling blades set atop the fuselage. Roll the 'giro forward under power of its propeller, and presto: the rotor turns and the plane rises. Whatever happened to this device? you ask as you look at two of them in this gallery.

Space flight takes up three other galleries exclusively. You trace the story of Mercury, Gemini and Apollo—the steps to the moon, the goal of dreamers for hundreds of years. The recorded voices of those dramatic moon missions are gathered here along with such "space hardware" as the lunar roving vehicle, the world's first extra-terrestrial car.

Apollo 15 was the first lunar mission to use this vehicle, traversing an area of the moon's surface in July 1971. This was well after the excitement of Apollo 13, when the spacecraft was wracked by an explosion, and all the world tuned in to sweat down the resourceful—and still surprisingly cheerful—crew who used the undamaged landing craft as "lifeboat."

Satellites and sounding rockets have their own gallery where they festoon the dark ceiling and remind us

Satellites of every kind—to report the weather, establish communications and answer innumerable

that they still do their jobs in telecommunications, weather forecasting and other scientific fields. A gallery of rocketry goes into their history and application. Finally, the Life in the Universe gallery provides a highly rewarding experience in answer to those old questions of what exists beyond our ken. A mosaic of photographs taken of Mars by probes that whizzed by the red planet gives an idea of what that barren landscape is like. A film commentary theorizes about the origin of the Universe. Weird creatures that might inhabit some alien planet are displayed as you adjust the

scientific questions about space environment—
hang from dark ceiling of satellites gallery.

imaginary conditions for life. Here, too, is a model of the starship *Enterprise*, straight from the set of the television series *Star Trek*.

Two presentation centers, an art gallery and a library complete your exposure to air and space. The library is available upon application, offering volumes, periodicals and pictures. It's on the third floor, as is the cafeteria with its splendid view of the Mall. The gallery called Flight in the Arts provides drawings, prints, paintings and sculpture relating to air and space. In the theater a recently developed projector (it is one of six in the world) uses special film to provide an extraordinary visual experience. The picture fills a screen that is about six stories wide and four stories high. Multiple speakers wrap you in sound. It doubles as an auditorium or regular movie theater.

The Albert Einstein Spacearium puts you under a domed ceiling for a close scrutiny of the heavens. The planetarium instrument which projects this show is a Bicentennial gift from the Federal Republic of Germany. For an idea of what might be seen in this representation of the cosmos, turn the page.

Air and Space Museum continued

Spacearium: travel in time and space

The projector in the photograph below can show the night sky in the Albert Einstein Spacearium for past or future. For example, at the turn of a knob it can produce the sky as we will see it on the Fourth of July—here looking west about an hour after sunset in a painting by Helmut K. Wimmer. The first-quarter moon hangs in the southwest.

The two lens-studded spheres (1) at the ends of the instrument project a total of 8,900 stars; northern hemisphere stars are projected by the left sphere, and southern by the right. Inside the framework at (2) and (3) are projectors for the sun, moon and five naked-eye planets. The disks at (4) provide horizon's glow. Small spheres (5) project celestial coordinates. Electric motors and gears housed in the middle (6) can show a 24-hour cycle in the sky for any time period between 30 seconds and 36 minutes. Small tubes and cylinders attached to the large spheres project first-magnitude stars, the Milky Way, clouds and a comet. This conformation of stars is not much different from what it will be July 4, 2076.

BIG
DIPPER

LEO

REGULUS

MARS

SATURN

POLLUX

CASTOR

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By Eric von Schmidt

Custer, dying again at that last stand, is in a new painting

Bad day at the Little Bighorn lives on after 100 years of barroom art, now capped by a meticulously researched 13-foot painting

Brevet Maj. Gen. George A. Custer sat for Mathew Brady near the close of the Civil War.

"There are many little incidents connected with this fight, but I don't recollect them now. I don't like to talk about that fight. If I hear any of my people talk about it, I always move away."

The "fight" that the Sioux warrior Red Horse referred to was the defeat of the 7th Cavalry, led by Lt. Col. George A. Custer, by assembled bands of Sioux and Northern Cheyenne camped along the Little Bighorn River on June 25, 1876. Red Horse's statement was made to military authorities eight months later. It had already become uncomfortable for an Indian who had fought that battle to remember those "many little incidents."

So subterfuge has clouded the events of that bloody Sunday in the wilds of what is now southern Montana. Indians feared reprisals. Survivors of the elite 7th Cavalry groped painfully for excuses, scapegoats, anything to salvage their shattered pride.

It is sometimes assumed that there were no white survivors. There were none in the five companies that rode north with Custer after he divided his command, but though the other seven companies who fought four or five miles south of Custer suffered heavy casualties, most lived to describe what went on in their section and to speculate about what went wrong with the campaign.

Five years after the battle, Red Horse repeated his story to Acting Assistant Surgeon Charles E. McChesney. This time he also made careful drawings, 42 of them done with colored pencils on large sheets of Manila paper. Superficially they resemble the drawing of a talented child, but they are charged with a special power. Lean, emotionless, quantitative, they are a *record* of the event, making no attempt to interpret it. In 1971, after deciding to do a painting of the fight, I made a special trip to the Anthropological Archives at the Smithsonian Institution to view these drawings, some of which are on exhibit at the National Portrait Gallery (p. 61). My hope was that they would provide many details of dress and weapons and possibly some special insight. They were fascinating, yet I felt I had opened one mysterious box and found another inside. Search for the *real* Custer battle was just beginning.

My very first viewing of the most famous Custer painting was about 30 years ago in a barroom on the main street of Durango, Colorado. I was underage, skinny and with only the faintest trace of fuzz on my cheeks. My companion looked almost old enough to be there legally. The place was dark as a cave, and the only light shone on a painting of a portly gentleman who seemed to be engaged in fighting off the entire Zulu Nation. Some nasty doings in the right foreground were beginning to reveal themselves just about the time the bartender slid us our dime drafts. Like

Wearing buckskins, famous locks shorn, Lt. Col. Custer reaches the end in a detail of the author's painting. An adjutant is down at left; Indians later tore off one flowing sideburn.

A new Custer painting

any tough hombres out on the town, we drained our glasses in a single swallow. Painting, bartender, all Durango soon dissolved in a blur. How fitting that my first glass of beer should coincide with my introduction to "Custer's Last Fight" (p. 61). I realized later that Adolphus Busch had planned it that way.

Millions of parched Americans have slaked their thirst and gazed, with diminishing sobriety, at that harrowing scene:"General"Custer with sword endlessly poised, the killing bullet forever seeking its target. According to Don Russell's informative book, *Custer's Last,* the Anheuser-Busch brewers have distributed 150,000 copies of this color lithograph since its first printing in 1895.

The original painting, from which this lithograph derived, was made by a Civil War veteran, Cassilly Adams, sometime before 1886. It was financed by others, including John C. Furber, a St. Louis bar owner. A tour with the painting flopped, and all 9½ by 6½ feet of it ended up back in Furber's saloon. Even there, the rather crude, rawboned work proved no match for the opulent celebrations of female anatomy found in most contemporary bars. Furber's saloon failed, the creditors pounced and in 1890 Cassilly Adams' painting of the Little Bighorn was either bought or seized as a creditor's asset by the Anheuser-Busch Brewing Association.

In 1895, one F. Otto Becker of Milwaukee was hired to paint a smaller version of the Adams work for a color lithograph. It is in Becker's canvas that the strange shields appear and Custer gains something of a beer drinker's paunch. Yet Becker based his background on an actual photograph taken from the ridge where Custer and his men were found by burial parties. The completed painting was cut into sections to allow several lithographers to work at once on preparation of color plates. Becker returned to obscurity; Busch made advertising history; the reality of the Custer fight dimmed to murk.

It is tantalizing to speculate about the effect this distorted piece of history has had on all those boozers. It's hard to imagine anyone thinking that Custer died for his sins. Equally capricious, but hard to resist, are patterns of national stereotypes that seem to influence many depictions of the battle done before 1900. If America was a melting pot, precious little melting had occurred for recent immigrants during this period. Their interpretations tend to reflect this.

Irish-born John Mulvany's large painting *Custer's Last Rally* (1881) was acclaimed as uniquely American. To me, the central figures all look broodingly Irish and could just as well be sulking around a pub as fighting a pitched battle. (Mulvany threw himself in the East River and drowned in 1906.)

Artist, composer, folk singer, Mr. von Schmidt researched his painting, Here Fell Custer, *until he felt like a survivor. It hangs this month at Contemporary Arts Museum in Houston.*

Perfect military array depicted

Long before O. Becker trimmed Cassilly Adams down to size, only to see his own work chopped into pieces, Feodor Fuchs had given the world its first color lithograph of the event—in 1876. It is a splendidly Teutonic show, with soldiers all at full gallop, firing a perfect volley at only slightly less disciplined Indians. It's hard to imagine how the cavalry can lose this one, but since the title is *Custer's Last Charge* we are sure that they'll manage. In *General Custer's Death Struggle* (1878), artist H. Steinegger has, with vigorous larceny, ripped off the composition of not one, but *two* earlier prints, one by William de la Montagne Cary, the other by the great Civil War artist and correspondent Alfred R. Waud, who had sketched Custer many times and had even accompanied him on a cavalry raid in 1864.

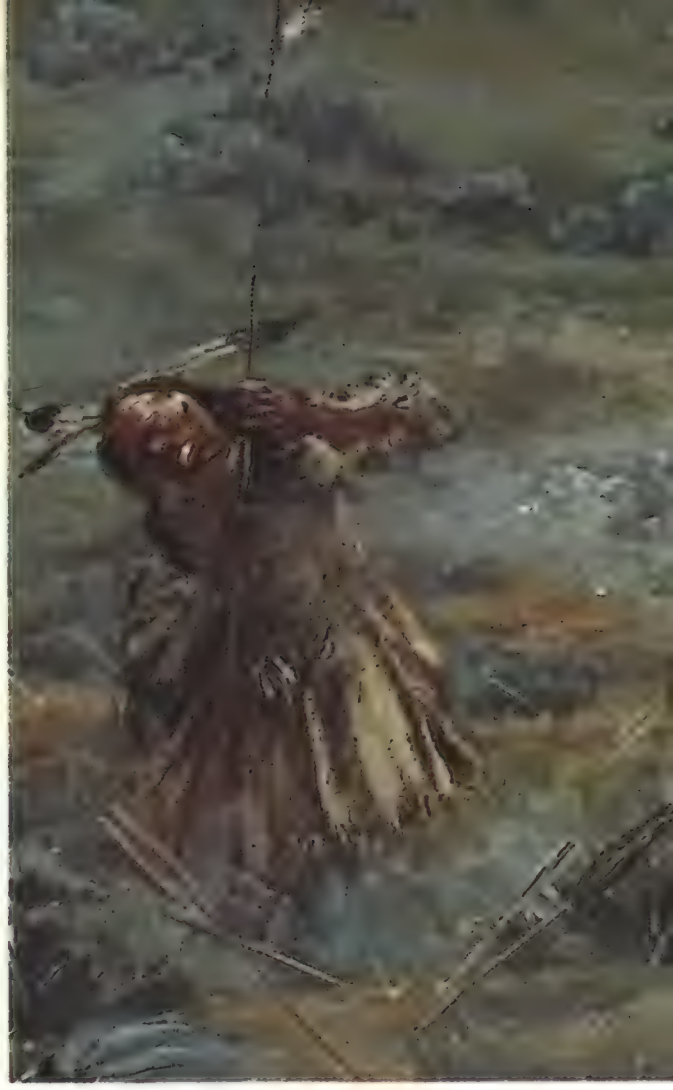
Edward S. Paxson's large painting, some 20 years later, shows six identifiable officers and virtually every Indian leader in the fight, all miraculously converging in the same place at the same time. Paxson did all later students of the battle a large favor by writing General Edward S. Godfrey, a survivor and member of the burial parties, to ask what arms, uniforms and equipment were actually used in the battle. Godfrey's reply is the best and most concise information on this subject that we will probably ever have.

The earliest paintings place Custer smack-dab in the middle of the scene, often in the foreground. This naive, posterlike treatment is forceful and dramatic, putting a large event on a small stage. Around the turn

CUSTER'S LAST FIGHT.
The Original Painting has been Presented to the Seventh Regiment U.S. Cavalry
BY ANHEUSER BUSCH BREWING ASSOCIATION,
ST. LOUIS. MO. U.S.A.

Famed Anheuser-Busch print fictionalizes hand-to-hand combat. Indian and soldier faces are repeated. Scenery is authentic.

Red Cloud's drawing, now in Smithsonian exhibit, indicates use of guns versus arrows. Hoofprints stipple left half.



In details, Cheyenne "counts coup" by smashing a skull. Sioux above is shot by a dying trooper. Indians said

of the century, as reproduction and printing techniques improved, the old frontal approach began to look out of date. Correspondingly, as the reality of the Custer fight dimmed to legend, its graphic image shifted, too. The gallant figure, with his handful of brave, gore-splattered troops, began to recede into the distance. A more sophisticated, more nostalgic concept of the battle appeared. The wild, swirling Indians became foreground figures, as Custer and his men faded in a soft blue haze.

There are estimates that more than 1,000 depictions of the fight have been made. One was painted by Harold von Schmidt for *Esquire* in 1950. Being Harold von Schmidt's son, and by that time something of an expert at posing (as a baby, then a small child, then a medium-sized child, then a jockey, then *anything*), I served in the Custer fight as both trooper and Indian. The painting combines elements of both the early "frontal" and later "nostalgic" styles and it works, I think. There are inaccuracies in the uniforms and equipment of the soldiers, but there are other authentic touches such as Custer's short-barreled pistols. My father thought Custer a glory-hunting ass, and it is ironic that his painting is now considered a somewhat romantic interpretation.

It wasn't until 20 years later that I finally caught that damnable fever that rises off the Little Bighorn. I read everything I could lay my hands on, and slowly came to feel there was something about all the paintings that seemed to me discordant. My feeling was undefinable but gut deep. When I tracked it down, finally, it was so simple: In all the pictures the viewer's vantage point was that of an attacking Indian.

Red Horse *was* one of the attacking Indians, Waud was not, nor were Adams, Becker, Paxson and the rest. Nor am I. I felt it was important to give the viewer a sense of what the troopers were experiencing as their individual deaths pressed in upon them.

The Red Horse drawings, so illusive before, became in an unexpected way a revelation. All those drawings of tepees, row after row, page after page, had at first been confusing, annoying. Now, considering the fight from the troopers' viewpoint, their cumulative image filled me with an awesome sense of the size of that village. It had been fully visible to Custer and his men on the ridge, stretching out for more than three miles and in some places bellying more than a half-mile wide—one of the biggest encampments ever assembled.

Details of dress and equipment turned up elsewhere. The first big surprise came in discussions at the Military History Division of the Smithsonian. It turned out that cavalrymen were not issued blue shirts during this period, though virtually every applicable painting and literary work mistakenly assumes that they were.

they lost only 30 to 50 in the fight. Writhing trooper at right tries to wrench out a triangular war arrow used by the attackers.

Civilian blue shirts seem to have been worn by nearly all officers of the 7th Cavalry, and "hickory" shirts of fine blue or brown checks were sometimes worn by men of all ranks. The issue shirt, however, was a loose-fitting, light-gray pullover, with three metal buttons.

Uniforms in general were of inferior material, and equipment was outdated. Trousers in those penny-pinching days had suspender buttons but no suspenders. The issue headgear, a bizarre black hat that could be rigged up to present a Napoleonic appearance, was described by one officer as "the most useless, uncouth rag ever put on a man's head." Troops often bought civilian hats, black or gray, of felt or straw, found on the march from traders.

The men altered or improved on basic issue in many ways. They would reinforce the inside and cuff of their pants legs with canvas. They would fashion homemade cartridge belts of canvas—more efficient than the issued leather pouches. Old Civil War gear was also used: jackets, vests, forage caps. Regulations of 1877 at Fort Lincoln, Nebraska, forbade use of civilian clothing for the 7th Cavalry. Before that, just about anything went in the way of clothing.

Regimental officers, right up to Custer, were even more casual in their dress than enlisted men. They were a jaunty, self-confident lot, and favored buckskin suits, often double-breasted, or just the jacket alone, worn over blue, wide-collared civilian shirts with bibs, white trim and a mess of buttons.

The notion that the Indians rode in a huge circle pumping lead into a knot of troopers becomes absurd after a visit to the battlefield. Most Indians must have ridden within a short distance of the ridge, then fought on foot. Except for occasional individual dashes up the ridge, the Indians said they did not move up it in force until they thought all the troopers were dead.

The terrain offered the Indians excellent concealment, and there is every indication that they used it. The position of Custer and his men, scattered up the slope, was totally indefensible. It is unlikely that anyone would have been standing, except to get somewhere else fast. The troopers' only chance for cover was to shoot their horses for breastworks.

The theory that the soldiers were outgunned does not hold up. The whole Indian village contained only a small number of repeating rifles and little ammunition. That the cavalry's defeat was caused by the malfunction of their Springfield '73 carbines is equally dubious. Some did jam, but these same weapons, taken from fallen troopers, gave the Indians their most effective firepower. But it was here that the arrow, as in the time when the Akkadians first used it to defeat the Sumerians around 2500 B.C., was again the deciding weapon. This was the last time it won a historic battle.

Metal-tipped Indian arrows rained on the desperate men and animals struggling on the ridge.

The soldiers, exhausted from hard marching and little sleep, sweat-stained and covered with alkali dust, looked out at massive clouds of dust and gunsmoke rising in the heat. These clouds became so dense that an eerie and unnatural twilight fell over the field. The Indians swarmed in the distance like stinging ants. They said afterwards that they couldn't see more than ten feet, and several times Indian killed Indian in the smoke and confusion.

Custer was not killed by arrows. According to Lieutenant Godfrey, "He had been shot in the left temple and left breast. *There were no powder marks or signs of mutilation.*" This emphasis on the lack of powder burns and mutilation was meant to dispel rumors that Custer had committed suicide and had been horribly mangled by the Indians. We'll never know for sure, but it must be kept in mind that the Indians did not know whom they were fighting, and that any mutilation would have been a random thing. Most of the dead troopers, some 212, found with Custer, were mutilated, however, for Plains Indians believed that an enemy arrived in the spirit world in the same physical condition he left this one, and so the dismembering of the freshly killed implied a special vindictiveness.

Aside from scalping and the shooting of bullets and arrows into the bodies by the warriors themselves, most ritual mutilation was done by women who had lost family or relatives in recent combat.

Mention of suicide among the troopers is almost as taboo today as 100 years ago. But one old Western cavalryman has said, "It was understood by every soldier, trapper and mountaineer, who knew the habits of the wild Indians, that he should save the last shot for himself and take his own life rather than be captured."

Custer's troops did just this, according to several Indian accounts. The Northern Cheyenne warrior, Wooden Leg, at first thought it was whiskey found in some canteens that explained why soldiers "went crazy. Instead of shooting

us, they turned their guns upon themselves," he noted.

Custer's command was understrength, as were many units in those days. A number of enlisted men were recent recruits, often German and Irish immigrants who had never fought Indians and had trouble staying on a horse. The average age of a private was almost 30, but experience was lacking. Many officers openly despised each other. Some fought bravely right to the end, but they were facing a total force of up to 4,000 Sioux and Northern Cheyenne.

The noise alone must have been overwhelming: shrill blasts of eagle-bone whistles carried by most of the warriors, high-pitched war cries, shouts, the dull roar of horses' hooves, shrieks of wounded men and horses, the rattle of gunfire and the ceaseless deadly whirr of arrows—a dissonant cacophony of death. Custer's fight was probably over in little more than half an hour.

Two days after the death of Custer and his men, burial parties attempted to identify the dead. In my painting I've included only those who were known to have been found near Custer. These are, (left to right, below) Lt. Algernon E. Smith, wearing vest, behind dead horse; crawling, Capt. Thomas W. Custer, the Colonel's brother; over his head, down the slope, Capt. George W. Yates, wearing buckskin jacket and black hat. These officers commanded three of the five companies with Custer but were not killed with their men. This indicates a breakdown of leadership.

Farther down and to right of the dead white horse is Lt. William Van W. Reily. The man holding Custer's personal guidon (made by his wife) is Sgt. Robert Hughes, Irish-born. The dead trooper fallen on the clump of sagebrush is Chief Trumpeter Henry Voss. The man falling just above the dead horse's head is Lt. W.W. Cooke, Custer's adjutant. Cooke was born in Canada, and like nearly all of the officers had fought in the Civil War and had been with the 7th Cavalry since its formation in 1866. One side of his flowing whiskers was scalped by the Cheyenne Wooden Leg.

Wounded and kneeling is Lt. Col. George Armstrong Custer. Most recent paintings portray him without his buckskin jacket. This interpretation is based on a statement by Trumpeter John Martin (Giovanni Martini), the last man to see him alive. This statement, however, refers to Custer's dress before 8:30 A.M., long before the command was in movement. Though it was a hot day, Tom Custer was wearing a jacket when stripped by Indians and there are numerous Indian accounts of having fought men wearing buckskin jackets. Colonel Custer was noted for his lack of regard for physical discomfort (his own, as well as that of his troops) and I've not been able to find a single photograph of him without some kind of a jacket.

According to Lieutenant Godfrey, he carried "a Remington Sporting rifle, octagonal barrel; two Bulldog self-cocking, English, white-handled pistols, with a ring in the butt for a lanyard; a hunting knife in a beaded fringed scabbard; and a canvas cartridge belt." Thus was he equipped 100 years ago, when the famous Custer luck finally ran out, as shown in the details of the whole painting below.

Sixteen days out of Houston, loaded trucks arrive at Prudhoe Bay oil field in 50-below weather.

The lurid flares are wastes burning off from a nearby oil refinery producing diesel fuel and gasoline.

By David Snell

Truckers roll their subculture into the Arctic

Men who fit a new folk-hero image deliver the goods—and their Citizens Band lingo—to frigid Alaska pipeline project

On a chill, gray midmorning in Houston, Texas, two 18-wheel trailer trucks (one pulling a wide-loaded step-deck with a mysterious-looking, bungalow-sized steel box labeled "Arctic Inspection Unit") eased through a downtown interchange and headed north on I-45, into an approaching cold front.

The drivers, Andrew B. Coalson jr., 54, and David Gullickson, 24, were employees of Hill & Hill Truck Line, Inc., a Houston-based carrier that specializes in hauling oil field equipment and drilling supplies over some of the continent's longest and meanest routes.

In the southbound lane, a little red AMC Gremlin came along, its towering rear-mounted antennas whipping in the wind like chrome fishing poles.

"Breaker one-nine! How about that northbound 18-wheeler with the wide load?" came a voice, blotting out the urban cacophony that filled channel 19, used mainly by truckers on the Citizens Band radio. "You got your ears on? How 'bout a copy for that Nervous Wreck?"

The driver of the little four-wheeler was playing America's newest motoring game, which is ratchet-jawing at truckers in their own CB lingo. In the cab of the lead truck, the one pulling the wide load, Junior Coalson grinned and reached for his microphone.

"Ten-four, Mister Nervous Wreck," he said. "You got that northbound, and we copy you wall to wall and treetop tall. Come on?"

"Ten-four," replied Nervous Wreck, repeating the code numerals that mean a message is received. "Say,

Photographs by A. Y. Owen

On the road, Junior Coalson speaks into his CB microphone. His radio handle is Paw-Paw.

Talking back, Dave Gullickson identifies himself with his own shortwave handle, Crackerjack.

where y'all headed with that big old icebox of yours?"

"We're just going to carry it up the boulevard a piece, to that old Alaska country, and set it down under the palm trees on that pretty Prudhoe beach."

"Goodness gracious and mercy sakes, good buddy! Well, I can't help you much, but at least you got it clean and green for about six miles back. So put the hammer down, pedal to the metal!"

"Ten-four, Mister Nervous Wreck, we sure appreciate that good information. You have yourself a good day and a better one tomorrow, and we'll be listening to catch you on the flip side, for sure. We gone!"

Junior already had the hammer down. For the short run, at least, the road would be clean and clear of that old bear Smokey, the man in the black-and-white of the highway patrol, who may give you an extra five mph for free before he gets you down and chews on you and makes you pay the Green Stamps. But in the head wind they were bucking, from a land of stinging cold that was still far away, it would have taken some kind of extra hammer to push that wide load past the 55-mph speed limit that truckers call the Double Nickel.

The thing was not an icebox. It was a one-of-a-kind automated laboratory, built by AMF Tuboscope at a cost of $500,000, to be used for the detection of molecular imperfections in pipe and drill stem in an Arctic environment so cold that invisibly flawed steel can crystallize and snap like a twig. Crammed with sophisticated optical, magnetic, ultrasonic, electronic and gamma-ray scanning devices, it was 12 feet wide, stood 10½ feet high and weighed 32,560 pounds. Aboard the second truck were 15,500 pounds of exterior attachments, plus some big crates of parts and supplies.

The two 18-wheelers in tandem convoy would roll 5,000 miles up the spine of the continent to an ice-locked inlet of the Arctic Ocean, at the Prudhoe Bay oil field on the Alaskan north slope. It was routine business: for young Dave Gullickson, this would be his seventh run to Alaska at the wheel of a Hill & Hill truck; it would be Junior Coalson's 88th.

Harold F. Ormston, the rugged, 74-year-old president of the trucking company, had commissioned the Kenworth Truck people, whose tractor has been called the Rolls-Royce of trucks, to build a fleet of such rigs to his specifications. They were not of the familiar "cab-over" design, in which the driver sits directly over the engine and wheels, but of so-called conventional design, with engine and wheels forward of the cab.

The conventional that Kenworth came up with was an unconventional juggernaut. Its angular fenders of

David Snell (given the handle of Chili Head by his trucker friends) is a writer based in Houston. A. Y. Owen photographed Texas Longhorns for the June 1974 SMITHSONIAN.

Sign welcomes Coalson and Gullickson to Pueblo; they perch on "Moose Killer" front end of truck cab.

welded deck steel, its shielded radiator and steel-protected headlamps brought to mind a personnel carrier from World War I. Company drivers took to calling its customized front end the Moose Killer.

The purchase price of one of these 15-gear tractors is roughly $45,000. It also has about $7,000 worth of special equipment essential to Arctic travel, including the patented Jacob Engine Brake to supplement the air-braking system, and a heater to prevent the diesel fuel in the tanks from solidifying in extreme cold.

In good times and bad, America drinks of the elixir of self-discovery. In this, the Bicentennial year, there is a discovery that seems not remotely connected with the birth-year milestone: the long-haul truck driver as folk hero. He and she—of possibly 650,000 long-haulers, several thousand are female—are written about in books, sung about on jukeboxes, dramatized on TV, chattered at on the highway. They are strikingly dissimilar in background, but Coalson and Gullickson fit precisely into the mold, although there are raunchy drivers who are by no means goodness-graciousers.

The trucker, according to the title of a recent book by Jane Stern, is the last American cowboy. In Coalson's case the point is well taken. A part-Cherokee forebear of his was Jesse Chisholm, who scouted the famous cattle trail that bore his name. As a boy, Junior himself rode herd on his father's ranch north of Uvalde, Texas. But the day he turned 16 he told his father that he would never again sit straddle of a horse. In almost four decades of trucking, with time out in World War II to serve as a heavy equipment handler in the Air Corps, he has kept that promise.

Junior stands just over six feet tall. Despite the truck-stop café fare of French fries, cheeseburgers, chili, fat-marbled steaks and pie that grossly lards the midriffs of so many truckers who seldom do more walking than it takes to check 18 tires, he manages to stay around a hard 190 pounds. The grin-crinkles on his face were put there by a wry good humor and by squinting into 10,000 sunrises and sunsets.

"Convoy" isn't the way it is

As for the folk-hero business, he would surely regard it as a baffling abstraction. But he has traveled enough miles, and made enough friends, and lent a hand to enough truckers whose rigs have broken down on the highway in terrible weather or spun off into the ditch, to become something of a legend among others of his calling. Up and down the land his CB handle of Paw-Paw, which he uses because that is what his grandchildren call him, often brings hollers of recognition.

Next to the CB, the personal accessory Junior cherishes most is his stereo tape deck. On a lonely road where there's nobody to give him a radio holler, he'll invariably transport himself musically to Nashville, usually with a tape by Dolly Parton. A particular abomination to him is the C.W. McCall jukebox ode to long-haul super-scofflawry, "Convoy."

"It just isn't the way it is," he says.

Unlike the Rubber Duck-handled hero of the McCall recording, Junior just goes his cool-headed way on the long haul. From that big old Dome Town (Houston) to wherever, he rolls up his 11½-cents-a-mile pay in the lower 48 states and southern Canada, and 14½ cents on the treacherous Alaska Highway. He keeps an attentive but respectful ear open for Smokey and shoots a frequent glance at the instrument-panel indicators of the health and performance of No. 873, which he calls "Old Mother." He does not go hunting bear and crashes no roadblocks or tollbooths.

Like Junior, Dave Gullickson is a six-footer. The Canadian-born son of a seismologist who moved to Texas when Dave was a child, he once drove a truck as a produce hauler.

At the wheel of an 18-wheeler he displays the coordination and sense of timing that won him honors in gymnastics at a Dallas high school where he was a cheerleader. He is an accomplished skier. He wears his

All day and all night, a truck-stop café on I-45 is crowded with hungry truckers who eat and blast off.

hair short, a point in his favor among most truckers, and keeps to himself whatever political views he may have. He is sentimental about his truck, No. 882.

For him, too, the CB radio is a traveling companion, and he joins in the Smokey talk with other truckers. He liberally sprinkles his radio replies with the expletives allowed by the FCC, such as "Goodness gracious" "Mercy sakes alive!" and "Heavens to Betsy!" His CB handle is Crackerjack.

One thing about Dave that few of his fellow drivers know is that he is a graduate of the University of Texas with a degree in economics. He saves his money and within a couple of years, if he decides to do it, will be able to put himself through law school.

The north route charted for Coalson and Gullickson would cross all the main east-west channels of the American trucking industry. The first one runs directly through Houston, from Jacksonville to Los Angeles. On the day the Tuboscope equipment was loaded, two men with very different perspectives on trucking and truckers pursued their separate callings east and west of the city on Interstate 10.

On the east side, the Rev. Dan T. Robinson, out of Clearwater, Florida, a 48-year-old former truck driver-turned-touring-evangelist, pulled his motor van, "The Circuit Rider," into the Key Truck Stop.

As the principal missionary of a nondenominational group called "Over The Road Evangelism," he travels the highways, bringing the Gospel, in a minor-key way, to any trucker who might care to receive it.

The first driver he approached at the Key Stop was Steve Stafford of McComb, Mississippi, whose trouble was that his truck had a break in the air line and he could use an extra pair of hands. Mr. Robinson fetched his tool kit and the two of them went to work. Later, when the job was done, he handed his new friend some tracts.

A sophisticated Smokey

And to the west, beyond the town of Katy, Trooper Larry Ballard of the Texas Highway Patrol was flip-flopping the interstate, cruising along for a few miles, then U-turning across the grass median to start the loop again. His radar cone, attached to the sophisticated new MV-7, was aimed forward.

Unlike earlier models of scanners in the leapfrog battle of technologies between police and speeders, it did not have to be set up in a fixed-position trap. Its built-in computer was compensating for his own forward speed, whatever it might be at any given instant. The indicator at his right knee was giving constant read-outs on the approaching traffic. A driver without a radar-field detector or CB ears is zapped before he even realizes there is an oncoming police unit.

The Rev. Dan Robinson, somewhat improbably, has "never met a trucker who didn't believe in God."

Trooper Ballard had his own CB ears on, and was monitoring the stir he was causing:

"Breaker one-nine, for a Smokey report! That old bear just flipped into the eastbound, and he's taking pictures both ways!"

"You got you a black-and-white running your front door for you, good buddy, and he's mean and hungry!"

Now an 18-wheel household mover approached from around a curve, its driver probably unaware of the new mobile capability of radar. He was in a cab-over Peterbilt and he was doing 62. It was not quite enough, in the trooper's judgment, to justify pulling him over with the bubblegum-machine red blinker.

"Better watch it there, Mister Westbound 18-wheeler," the officer said into the CB mike. "I got you locked on the radar at 62. Hold it down!"

"Ten-four, and mercy sakes!" replied the trucker, braking fast. "That cotton-pickin' speedometer just pure-dee snuck up on me. I 'preciate the friendly info."

"Generally we find the truckers mighty helpful," Trooper Ballard said to me, his passenger. "They'll call in reports on drunk drivers and accidents. And out in the country, when we're not around, they're always the first ones to stop at an accident and take charge of the traffic flow and render aid."

On the road north, Old Mother pounded steadily on, breathing the headwind into its air filter like some migrating mastodon sniffing for a familiar scent. Her big 350 Cummins diesel engine, the size and weight of a Volkswagen, was singing at 2,000 rpm as the miles fell behind. Sometimes Dave Gullickson's 882 took the "front door," ahead of its older sister, sometimes the rear.

Next day they picked up I-25 and climbed the pass toward Colorado, both trucks shifting down as the grade steepened. At noon on Saturdays, Colorado's

Junior (left) and Dave shoot a game of 8-ball pool in a motel bar on U.S. 87, near Moore, Montana.

In sleeper box of Old Mother, Coalson naps. When alone, he sleeps with a honed hatchet by his side.

Texas Trooper Larry Ballard checks the speeds of oncoming trucks and cars on his radar screen.

weekend wide-load embargo goes into effect. Junior and Dave cleared the port of entry and pulled into the big motel parking lot in Pueblo at 11:57 A.M. For drivers paid by the mile, a day and a half of downtime is no occasion for rejoicing.

By sundown Sunday it was warm enough to give the two Cummins 350s a night's rest. Except for brief shutdowns at fuel stops, the big engines had been working or idling ever since the convoy left Houston. Though it may seem a terrible waste of energy to laymen who often see rows and rows of them idling at truck stops, a diesel truck is best left running all night when the weather is cold. It can be pure hell to start a cold truck, even with infusions of ether, which all drivers carry.

On Monday morning the engines sneezed awake with ear-stunning blasts from their compressed air-activated starter mechanisms. Junior and Dave stowed their gear under the sleeper boxes and rolled.

North into Wyoming they drove, past Cheyenne and into the high country, the road narrowing and steepening, the cold moving in again on a crosswind that pounded in from the west, out of gray snow clouds over the Continental Divide, the force of it tilting the Tuboscope like a prairie schooner.

Up the steep grades they went at a slowing crawl, with Dave's No. 882 tailing, down the long glides as the trucks gathered momentum like mechanized avalanches, across the high places at cruising speed as vistas opened to the white-streaked range to the west and the sunlight-gilded buttes far to the east, around curves that brought small herds of pronghorn suddenly into view, and then twice across the ice-drugged North Platte as darkness began to settle in. Until, at last, the lights of Casper came into view.

The drivers dismounted into the cold terminal yard near the ghost shapes of trailers and forklifts. They cranked down the dollies, disconnected air lines and electrical cables and dropped their own trailers for the night. Junior said: "Come on, Mister Dave! Let's hop back in these fancy $45,000 sports cars of ours and go get us a steak!"

They were up at first light. During the night a six-inch snowfall had covered the motel parking area. Back at the yard they rehooked the trailers, took coffee with the terminal manager and hit the road.

"Old Mother walked that hill like it belonged to her," said Junior, after the first steep climb had provided a true test of driving conditions.

They entered Montana on U.S. 87 above Sheridan, crisscrossed the Little Bighorn and rolled through the ravined valley that had been a big encampment site of Plains Indians. To their right, high on a wintry-bleak hill as the trucks throttled on, pistons and tires pounding like tom-toms, was a grove of evergreens. It marks the graves of about 200 men of George Armstrong Custer's U.S. 7th Cavalry (p. 58).

The trucks hit Billings at the beginning of the afternoon rush hour. With blinker lights flashing, Dave pulled ahead and crossed a narrow steel-girdered bridge along a city truck route. The frozen river below the bridge was the Yellowstone, homebound route taken by William Clark in 1806 on his way to rejoin Meriwether Lewis' party below the river's junction with the Missouri.

At nightfall, Junior and Dave pulled into the lot at Eddie's Corner Motel and Cafe, at the junction of highways 191 and 87. They shot a few games of pool and ordered supper. Outside, under the cold starlit sky, Old Mother and No. 882 idled through the night.

The trucks moved out at dawn, the peaks in the west glowing pink in the first rays of the sun, the sky in the

A Colorado "Smokey" points his radar warningly rearward toward an approaching 18-wheeler.

east brightening to bronze, and house lights along the way winking awake. They crossed the Missouri River at Great Falls and headed up I-15, the wind rising, tumbleweeds skittering across the highway, the high range of Glacier National Park to the northwest dimly visible above the thick dust stream riding on the gale.

They entered Canada beyond Sweetgrass. Again the crosswind, blowing harder now—and reported on the Calgary radio as gusting to 60 mph—as they moved onto the plains of Alberta, their engines laboring, their radiator temperatures holding at 182 degrees Fahrenheit. The frosted vistas of stubbled wheat fields were as vast and forlorn as some lost and forgotten sea. Lethbridge . . . Fort Macleod . . . High River . . . and then Calgary fell behind, and in late afternoon the snow flurries came out of nowhere. Long after dark, Junior and Dave made the lights of Edmonton.

The next day, Thursday, was downtime. Old Mother and No. 882 needed servicing and there were minor repairs to be made. The terminal manager had to see to a thousand details relating to the movement of trucks and cargo. For Junior and Dave, he had to make arrangements for a pilot car to pick up the convoy at the British Columbia border—it being a requirement in that province, as well as up the line in Yukon Territory and Alaska, that wide-load hauls be preceded by a vehicle displaying a warning sign and a turret-mounted revolving light.

The weather news from the north was not good. A Telex message from a driver who had just reached Alaska told of blizzards on the upper Alaska Highway, with trucks spinning off the road.

Also, a check of operating permits showed that Dave Gullickson's No. 882 was due for some fresh paperwork and license updating at the British Columbia port of entry. It could take time. Meanwhile, the mechanics had detected heart murmurs in Old Mother's transmission. The convoy would have to separate. Dave would make a night run to Dawson Creek, to get the legalities attended to during Friday office hours, while Junior was catching up.

By nightfall Dave was rolling, north and west, with me as his passenger. The snowplows had been out and the surface was good. You could tell that Dave missed that big wide-loaded presence in his rear-view mirrors, or ahead of him plowing a tunnel through the wind. He missed the CB companionship of its driver, and the down-home commentary and calm reassurances. Trucking can be a lonely calling; the swift and easy friendships struck up at truck stops are a measure of that. Once the trucks go their separate ways, often the friendships are just as quickly and easily forgotten.

West of Valleyview, on provincial highway 43, Dave pulled into a roadside rest area and cut the headlights. To the right, beyond a snow-covered stretch of open ground and the tree line, a great arc of light, pale as moonglow, crossed the sky from horizon to horizon. It was in motion along its entire length, doubling upon itself and back-folding like a drapery, with vertical shafts soaring slowly toward the zenith, then subsiding. It was aurora borealis, the northern lights.

The spectacle lasted almost an hour, then faded quickly and vanished. For Dave Gullickson this had been a long and tiring day. He slid back into his sleeper box to get a couple of hours' nap. I continued to watch the northern sky but the light did not re-

An overturned cement truck sprawls beside the road south of Cheyenne. It collided with another truck.

Evelyn (Hotwheels) Schoepp in cab of her pilot car. She escorts trucks through Canada and Alaska.

appear. Like so many fleeting friendships of the road, it was gone.

Dawson Creek! The very name enflames the old fever. But this is not the Dawson City of gold-rush fame, far to the north, up on the Klondike. What Dawson Creek is famous for is the monumentlike marker in its downtown traffic circle. Canadians call such markers "cairns"; this one is Milepost Zero and it marks the lower terminus of that stupendously conceived relic of World War II, the Alaska Highway—our route from here north.

But first, meet Hotwheels. That's her CB handle. Her name is Evelyn Schoepp, she is a licensed practical nurse, and she is the owner and driver of Evelyn's Pilot Service, Fort St. John, B. C., just up the highway from Dawson Creek at Milepost 47.

Evelyn and her magic four-wheel drive, snow-tire-fitted, two-way radio-equipped, auxiliary fuel tank-loaded, Arctic gear-laden, sign-bearing, turret light-equipped, waxed and polished, red-painted 1976 crew-cab Ford pickup pilot car, now entering from stage left. She is followed closely by Junior Coalson and his able-to-take-nourishment Old Mother, with its half-million-dollar cargo and its passenger, Photographer Owen. They turn the traffic circle past Milepost Zero and parade through town to the trucker's café on the outskirts, where Dave Gullickson's rig, relicensed and ready, awaits.

Earrings adangle, and jauntily got up in new hair-do, tailored slacks, bright red blouse, crimson lipstick and a touch of French perfume, Evelyn is ready for the worst the Alaska Highway and the furies of winter can throw at her client, and is all business.

That business is to see Junior and his rig safely to the contracted-for destination—specifically, by giving him advance warning of obstacles in his path and ice slicks at places where he'd least want them, and by preventing his wide load from presenting itself as a heart-clutching surprise to some oncoming car, truck or out-of-season Winnebago on a slippery curve above a gorge so deep you couldn't even see the bottom of it.

Now, in the fading afternoon, Evelyn sat with the Texans in the café. She looked out the picture window at the street, brown-caked with old snow, that was the first leg of the Alaska Highway.

"Well," she said, "we've knocked off a whole mile of that cotton-picker. But time's a-getting on, and there's a couple more to go." Evelyn has never been to the land of cotton, but she 10-4's the lingo.

Junior swallowed the rest of his coffee. "O.K.," he said, "let's shake some iron."

Mile after mile of the highway fell behind, with Evelyn barking her bulletins about oncoming vehicles ("Eighteen-wheeler coming, and he's got the hammer down!") and the road hazards she was encountering ("Whoops! I almost spun out on that one! Watch that patch of ice around the bend. It's a bad easy-greasy!").

Northwest to Fort Nelson, the daylight travel hours noticeably shorter and the nights longer. Then generally westerly, with the mountains choking in upon the highway and becoming more precipitous as the trucks ground up the one called Steamboat and hurtled down it to begin another long ascent, narrow and winding in the final stages, to the pass that is the highest point on the Alaska Highway where, at the 4,250-foot-elevation crest at Mile 392.5, the road passes the summertime cloud-mirror called Summit Lake, now frozen and curlicued with moose trails.

And westward still, the road stitching back and forth across the Yukon border, to the town of Watson Lake. Another dip into British Columbia, back into the Yukon, on to Teslin, and 100 miles beyond that to Whitehorse and another crossing of one of history's celebrated trails. For it was at Whitehorse, on the

north-flowing Yukon River, that backpacking fortune-seekers, who had managed to survive the freezing trek up from Skagway on the Alaska panhandle, during the 1896-99 gold rush, embarked in skiffs and rafts and stern-wheelers for the swift run to the Klondike.

On the last night in Canada the temperature fell to 45 below. At the motel at Beaver Creek, near the Alaska border, Junior and Dave had to "walk" their rigs from time to time during the night, driving them back and forth to prevent solidification of the lubricant in the differentials. If this occurs and the condition is not remedied with a torch, the engine can twist and snap the drive rod. All night the big engines idled on, the vapor from their exhausts rising ghost-white.

Onward then to Fairbanks, humming under a luminous dome of ice-smog. Adrenalized by the energy crisis and a pivotal location on the route of the 800-mile-long Alaska pipeline, the city was experiencing a boom. There had been many disruptions of the old-frontier ways of doing things; one such disruption now directly concerned Junior and Dave.

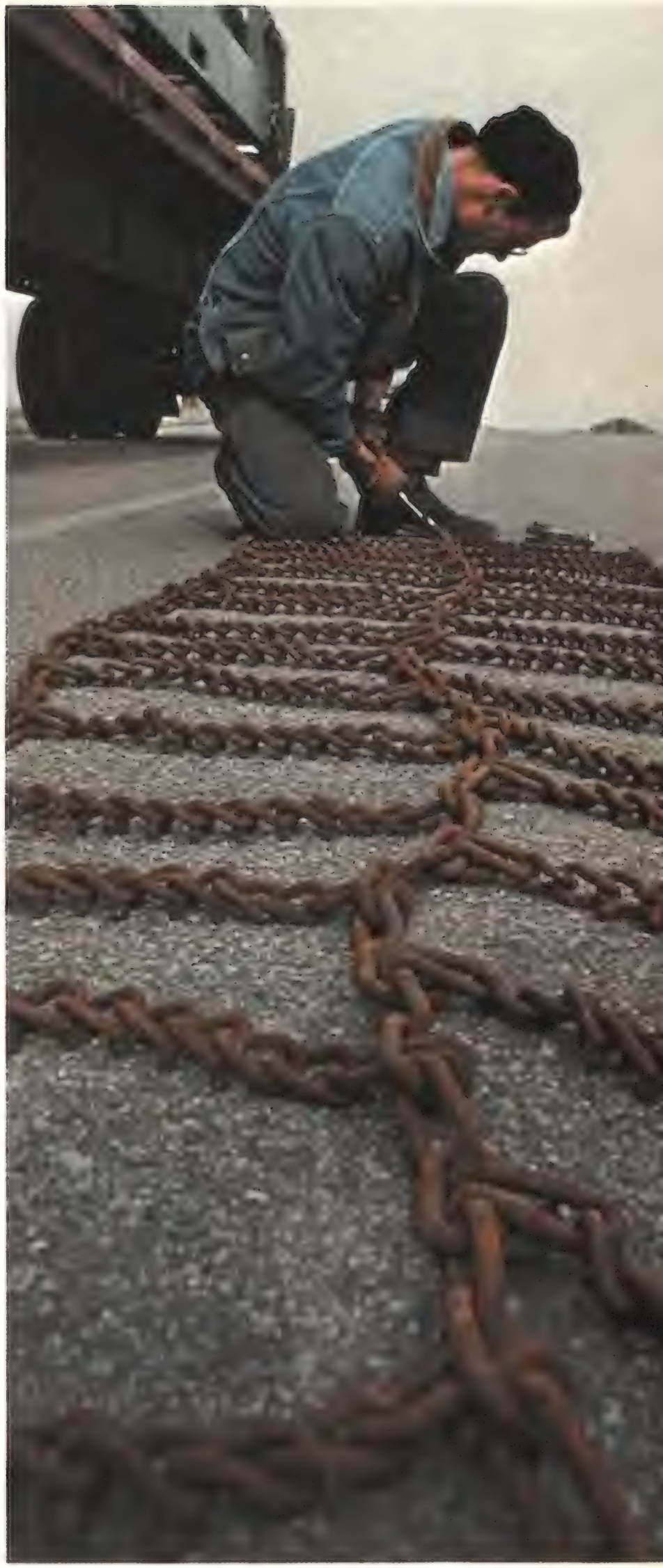
Now the Teamsters take over

Alyeska, the oil company consortium building the pipeline, had cleared the two trucks to travel to Prudhoe Bay on its privately run haul road—but not Junior and Dave. Contracts with the powerful (especially in Alaska) Teamsters Union were involved. And so two substitute drivers, accredited to the haul road where the union has control, flew up from Anchorage. Dave's No. 882 was assigned to Jack Barber, a 29-year-old outdoorsman and sometime gold prospector. To handle the wide-load rig, a 35-year-old driver named Bob Hohn, who used to work out of Houston, would take the wheel of Junior's Old Mother.

For the 1,000-mile trip to Prudhoe Bay and return, which would take five or six days including time in the loading yard, these two would be paid by the hour rather than by the mile. They would draw $10.50 an hour for the first eight hours of a working day, then $15.75 an hour at time and a half for ten hours on a guaranteed 18-hour day, whether it was on-duty time or not. In other words, they'd get $241.50 per day, plus meals and lodging for which Alyeska would bill the trucking company. For the pleasure of the drivers' company and the ride, photographer Owen and I would go the distance.

The first 147 miles, to the Yukon River, is a public highway, requiring pilot-car escort for a wide load. As on so many miles already traveled, Evelyn moved out ahead of the convoy—this time with Junior and Dave her passengers. They wanted to stick with their trucks, or close to them, as long as possible.

We left them standing in the snow near Evelyn's



Dave Gullickson checks his tire chains for worn links. Driving without chains in snow is "going barefoot."

pickup, which had halted a few yards from the first security checkpoint on the haul road, just north of the bridge across the Yukon. Dave looked perplexed. Junior seemed to grow visibly older, as the truck that was so much an extension of his being pulled away.

The quiet and reflective Bob Hohn and the flamboyant Jack Barber were good foils for each other and pleasant companions for the last leg. Hohn was in love with trucking and trucks, and caught up in the mystique. Barber was in love with everything, most of all the Alaskan wilderness. It was going to be a good trip.

Pushing steadily north, the haul road followed the stanchions and pumping stations of the pipeline, which sometimes ran alongside on the left and sometimes on the right, and 60 miles above the Yukon it crossed the Arctic Circle. There were plenty of animal tracks—wolf, Arctic fox and lynx, mainly—and on the high places the hoarfrosted dwarf firs resembled closely bunched stalagmites of purest white quartz. Off yonder you could see the brilliant, jagged, many-rippled folds of whiteness that are the Brooks Range.

Along the way there had been overnight layovers, in a stinging windless cold that dipped to minus 50 degrees and below, and lunch and fuel stops at the sprawling work camps set up by Alyeska and its contractors. These had proper-sounding names for the region—Livengood, Five-Mile, Old Man, Prospect, Coldfoot, Wiseman, Dietrich and Chandalar—and every prefabricated bit of them had been trucked in.

From Chandalar the road climbed through Atigun Pass to top out on the Continental Divide at an altitude of 4,800 feet. Then began the long descent onto the Alaskan North Slope, a plain that leads down to the Arctic Ocean and is as devoid of trees as the Sahara.

Somewhere out there the trucks pulled up and stopped, so we could watch a ballet performance by a dark-hued Arctic fox on a white slope a quarter of a mile off to the left. He was all alone and leaping about, pirouetting and prancing on his hind feet in the 45-below-zero cold for the pure delight of it. Sometimes, Barber said, wolves come right down to the haul road and cadge cookies and sandwiches from truckers.

A little later there was a dramatic interlude. The convoy cleared the top of a hill and came upon a stranded GMC trailer rig. The driver, M. D. Huffman, out of Fairbanks, said he had run over a piece of iron or something, and it had kicked up and knocked a hole in his left fuel tank that drained fuel from both tanks. He was dry—and 15 miles from the nearest camp in that minus 45-degree cold. Barber stuffed paper into the leak and siphoned enough diesel fuel from his own tanks to get the GMC to the camp. In that part of the world, a trucker who breaks down on the road sometimes has precious few minutes to get rolling again. The chill-factor chart issued to drivers at Old Man Camp warns that at 45 degrees below zero a wind speed of only ten knots can freeze flesh within 30 seconds.

The sunset that afternoon, the third one out from Fairbanks and the 16th since the departure from Houston, turned the distant peaks pink.

At 6:30 P.M.—four hours behind Houston time, which still registered on the truck tachometer clocks—the convoy moved past the blue runway lights at Deadhorse Airport. Minutes later the two trucks wheeled in and stopped in front of a couple of burning gas flares (pp. 66-67). The "pretty" Prudhoe Bay Beach that Junior Coalson had talked about on his CB radio lay just beyond. As drivers like to say, the trucks had delivered the goods. . . .

Back in Houston, a new Kenworth conventional was on order for Coalson, customized all the way, with the moose-killer front end. It would be No. 884 in the company fleet and it would get its maiden run on Junior's next trip to Alaska, which would begin within a week. Old Mother was going into semiretirement. For a year or two she would run hauls in the lower 48. After that she'd probably be relegated to yard work in some company terminal.

As for Junior Coalson, if he had to do it he figures he could step out right now and live on the interest from his savings. But there are still a lot of haul-miles he'd like to make. When and if retirement time ever catches up with him, he knows what he wants to do.

He and his wife Geraldine are going to buy a motor home and fix it up with a hi-fi stereo and a good CB radio. Then he will hit the road with her and shake some iron, and say into his mike: "We gone!"

Brooks Range, stark white against blue sky, looms beyond storage yard stocked with pipes as trucks pass.

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Our Nation's leading citizens and distinguished philatelists from every corner of the world will gather in Philadelphia on May 29, 1976, to inaugurate *The Revolution's Most Memorable Events*. At special ceremonies on the opening day of the historic nine-day International Philatelic Exposition, Interphil '76, *first* editions will be *officially*-certified by the coveted, one-day-only, *First Day of Issue* postmark of the city where America was born. These Official First Editions will be but a *small fraction* of the total number eventually available to the general public *after* that day.

For this historic occasion, the Philadelphia '76 Commission has appointed the world-renowned Fleetwood Company to issue the first edition of *The Revolution's Most Memorable Events* in *one complete* collection of four matched First Day of Issue Panels. The first one hundred collections have been reserved by the Commission for special presentations during the Bicentennial year. And, because of the importance of the issue, the Commission has also authorized Fleetwood to offer identical collections to America's citizens.

A truly impressive and historic series.

This is the only collection of First Day of Issue Panels *ever* dedicated to so monumental a theme. And it will be extraordinary in every respect. Superbly detailed and nobly composed, each panel is inspired by an historic work of art: "The Reading of the Declaration of Independence" and the "Surrender of Cornwallis" by the frieze encircling the Rotunda of the United States Capitol, painted by Brumidi. "The Hessian Surrender at Trenton," — made possible by the Crossing of the Delaware — by John Trumbull's masterpiece at Yale University. And "Washington at Valley Forge, 1778" by Brumidi's lunette in the National Capitol.

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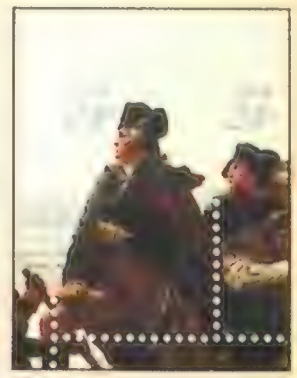

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TIP TOP QUARTERLY

Issued Quarterly. By subscription, $2.00 per year. Entered as second-class matter at the New York post-office by Street & Smith.

Vol. IV. No. 15 MARCH, 1900 Price Fifty Cents.

FRANK MERRIWELL AT YALE AGAIN

OR BATTLING FOR THE BLUE

FRANK DID NOT HESITATE TO TACKLE THE GIANT OF THE GRIDIRON.

By Bill Blackbeard

That nonpareil All-American boy reaches age 80

The most heroic Yaleman of them all got into print in 1896, stayed there for 856 novels and 17 million fictional words

Creator Gilbert Patten (photographed about 1900) wrote under a nom de plume, Burt L. Standish.

Frank Merriwell, the stalwart and square-jawed and level-eyed Yale man whose heroic fictional escapades probably imbued more American boys of his time with the heartfelt desire to go to college than any amount of formal schooling could have done, has just reached his 80th year of pulp-paper existence. He is still the classic image of sportsmanship and self-reliance.

Merriwell, unlike any other popular American fictional hero of the 1890s in his collegiate trappings (the magazine field then, as later, being glutted with detectives, cowboys, pirates and outlaws), was the creation of George William Patten and O. G. Smith, president of Street & Smith, a firm prominent in the publication of cheap paper fiction and one which already had printed a good deal of Patten's dime-novel writing. Smith was precise about what he wanted from Patten's pen when he wrote to Camden, Maine, on December 16, 1895, and asked for "something in the line of the Jack Harkaway stories, Gay Dashleigh series [from England] which we are running in *Good News* and the *Island School Series*. . . . The essential idea of this [new] series is to interest young readers in the career of a young man at a boarding school, preferably a military or a naval academy."

In part, Smith's interest in developing an American equivalent of the English schoolboy heroes for dime-novel readers lay in his worry over the then mercurial policy of the U.S. Post Office toward magazine mailing privileges for cheap-paper fiction. Post Office policy of the time forbade what was later written in the regulations as "matter tending to incite to murder, arson, abortion, assassination, or other immoral practices." These tenuously far-reaching interdictions were periodically invoked against the dime novels currently in circulation. Since most publishers of cheap fiction depended on the mails to transport their freshly printed titles in bulk (at about a cent a pound) to their retail outlets across the country, any arbitrary Post Office ruling against their usually lurid content could mean financial headache or even disaster.

The answer appeared to lie in creating a new breed of morally impeccable heroes to supplant the then highly popular array of dime-novel heroes such as Jesse James, Cole Younger and Wild Bill Hickok, or detectives of questionable means and character, such as Old Sleuth and Old King Brady, who wallowed in blood and corpses to the inhibited delight of their followers and the stoutly proclaimed horror of the formal authorities in school and government. Good and thoughtful writing produced in quantity seemed the best way to make comparatively lackluster heroes attract the juvenile readers of the dime novels, and Smith felt that the young Patten was the writer most likely to do the job he wanted done.

Patten proved him right, making Smith a fortune

In quarterly and "half-dime" versions, Merriwell's athletic feats were unequaled on playing fields.

TIP TOP WEEKLY
"An ideal publication for the American Youth"
No. 216.
Price, Five Cents.
FRANK MERRIWELL'S PHANTOM
OR THE GHOST OF BARNEY MULLOY
BY DUKE L. STANDISH
"DARNY GRISWOLD, THAT GUN IS LOADED AND THEY ARE GOING TO FIRE IT," MERRY CRIED.

TIP TOP WEEKLY
"AN IDEAL PUBLICATION FOR THE AMERICAN YOUTH"
No. 85.
NEW YORK, November 27, 1897.
Price Five Cents.
FRANK MERRIWELL'S MARK
By The Author of
FRANK MERRIWELL
"STOP, MASON!" CRIED FRANK. "STRIKE HIM AND I'LL GIVE YOU A MARK TO REMEMBER ME BY!"

Invincible as an athlete, Frank—the Superman of his time—was insuperable in everything else, too, whether being shot from a cannon or handing some street bully the thrashing of a lifetime.

and himself a comfortable living for most of his life. From the moment the opening lines of the first Merriwell story smote the young readers' eyes in haylofts and on horsehair sofas, the schoolboy hero's success was assured. In an age of a large rural readership, general adolescent naïveté and staunch moral standards, few kids could resist a story that started like this:

CHAPTER I
FRANK MAKES A FOE

"Get out!"

Thump! A shrill howl of pain.

"Stop it! That's my dog!"

"Oh, it is? Then you ought to be kicked too! Take that for your impudence!"

Cuff! A blow from an open hand sent the boyish owner of a whimpering poodle staggering to the ground, while paper bags of pop corn flew from his basket and scattered their snowy contents around.

"That was a cowardly blow!"

The last line was the first ever spoken by Frank Merriwell, who had just happened on the brutal scene of the abused boy and dog, and shot his denunciatory riposte at the ruffian delivering the kick and cuff.

In keeping with Smith's suggestion, Patten enrolled his new teen-age hero in a boys' academy in an Eastern state, giving its name in the title of the first Merriwell story, "Frank Merriwell, or First Days at Fardale," which Street & Smith published in the first issue of a new nickel magazine called *Tip Top Weekly* for April 18, 1896. It ran to 20,000 words, which was to be the general length of the weekly Merriwell novelettes Patten wrote for *Tip Top* over the next two decades.

The Merriwell that the kids of 1896 and the next two decades enjoyed so richly, with his Fardale fights against fiends who tried to poison the academy water supply and blow up the baseball diamond at the height of play (and his later grim battles in the wilds of the Pacific Southwest against the recurrent villain named Porfias del Norte, whom Patten described as having "every human depravity, and a few depravities that

Bill Blackbeard is founder and director of the San Francisco Academy of Comic Art.

TIP TOP WEEKLY.
Issued Weekly—By Subscription $1.50 per year. Entered as Second Class Matter at the N. Y. Post Office by STREET & SMITH.
No. 84. NEW YORK, November 20, 1897 Price Five Cents.
FRANK MERRIWELL'S DUEL
OR, A POINT OF HONOR
By the Author of FRANK MERRIWELL
WITH A HOARSE CRY, MARLINE THRUST STRAIGHT AT FRANK'S BREAST.

TIP TOP LIBRARY
Issued Weekly—By Subscription $1.50 per year. Entered as Second Class Matter at the N. Y. Post Office by STREET & SMITH.
April 25, 1896. Vol. 1, No. 2. Price Five Cents
FRANK MERRIWELL'S FOE
OR
PLEBE LIFE IN BARRACKS
BY
Burt L. Standish
FRANK SAW INZA GAZING AT HIM APPEALINGLY, HER FACE ASHEN WITH TERROR.

Frank was a master of fencing, too. But perhaps the greatest thrills for readers came from his repeated rescues of his girl, Inza Burrage, from such awful fates (above) as being hit by an onrushing train.

had not heretofore been regarded as human"), is in sharp contrast with the popular notion of Merriwell prevailing today, which limns him as primarily a sports hero, winning numerous football and baseball pennants in the last thrilling minutes of play.

For much of Patten's life, in the Merriwell series as elsewhere, he wrote against his own inclinations and ambitions. An admirer of Charles Dickens, he longed for the time to do work of equal caliber (happily ignoring the fact that Dickens' genius flowered in turning out, in the early *Pickwick Papers* and other works, the same kind of pre-assigned popular fiction at nearly the same breakneck pace, writing against the next installment's deadline, as Patten himself pursued).

Patten in fact grew up reading large quantities of what he would eventually write and later deplore—the horrific, action-filled dime novel of the 1880s and later: an artifact which really sold (with only a few exceptions) for a nickel, deriving its popular name from the earlier but short-lived ten-cent pocket-sized booklets of original fiction which the firm of Beadle & Adams had published during the Civil War.

Born in 1867 to a small-town Maine farming family, George William Patten startled his young friends in Corinna by shooting to six feet (but only 115 pounds) by the time he was 15. Nicknamed "Willie" when very young, the adolescent baseball fan decided both his given names were "sissy," dropped the William and insisted he be called Gilbert rather than George, although he used "Wm. G. Patten" as the byline on the cheap fiction stories he began to submit to such papers as the Beadle & Adams *Banner Weekly*. His first two short stories sold for $3 each—a respectable sum in 1886. He immediately wrote a short novel, which appeared in the Beadle & Adams Half-Dime Library, under the title of *The Diamond Sport*, or *The Double Face of Bed Rock*. He was paid $50 for it—and acquired a lifetime vocation.

With hundreds of stories and untold hours of toil at the inkwell behind him, the 29-year-old Patten of 1896 tackled the twin assignments of naming his newly assigned schoolboy hero for Street & Smith and inventing a pen name to use in writing about the boy. (A pen name was necessary, authors were told, so that readers

following a series of stories would not be perturbed by any sudden death or illness of the author and an according change of byline. The actual reason, of course, was that a fictional byline enabled a publisher to fire a writer at will without the readers' being aware that anything had happened.) Patten gave this explanation for the name he gave his hero: "I took the three qualities I most wanted him to embody—frank and merry in nature and well in body and mind—and made the name Frank Merriwell."

For his own byline for the *Tip Top* series—Burt L. Standish—Patten used the last name of one of his favorite historic and poetic figures, Miles Standish, while the "Burt L." was derived from Gilbert.

The first issue of *Tip Top Weekly,* dated April 18, 1896, sold out on all newsstands; within three months the weekly circulation had peaked at a steady 75,000 readers. Patten had his first assured income as a writer —but it was not an unleavened joy. "Twenty thousand words a week!" he said in an interview. "That meant more than a million words a year—at the rate of one full-length novel a month. And when you turn out stuff that fast for 17 years, you're grinding copy."

But Patten and O. G. Smith made one bad mistake in planning the Merriwell saga. They neglected to lock their hero permanently into either the Fardale or Yale background at an unchanging age, like Orphan Annie, so that he could carry on through decades of stories for ever-new generations of readers. In an abortive stab at realism, they opted for a ten-year fictional coverage of Merriwell's progress from Fardale to senior status at Yale—and when they found themselves around 1905 with Frank about to graduate *cum laude,* and with a still-fascinated readership now numbering more than 100,000 a week, they panicked. It was impossible to start Frank all over again. Following Frank's career as a businessman, even in adventurous circumstances, meant abandoning the popular student-hero concept, while keeping him on campus in an academic or coaching role would irremediably age him in the eyes of his ardent fans.

The solution was none too good, but Patten tackled it anyway. Suddenly, from nowhere, a long-lost half-brother of Frank's named Dick Merriwell emerged. Lamely, it was explained that Frank's father, by then a widower, had married again a decade after Frank's birth, siring Dick in the process. So the readers were presented with a brand new Merriwell, starting the academic process all over again. Unfortunately, Dick wasn't Frank. Patten was too astute simply to duplicate Frank in Dick, although that was what readers expected. Where Frank was an expert ventriloquist, Dick was able to "converse" with wild animals. But it didn't wash with the readers.

Clearly, Patten's ability to write hadn't flagged; O.

Frank lives on in paperbacks (above), having survived all manner of "modern" hazards (opposite).

G. Smith could see that. What was obviously needed was Frank's name back in the *Tip Top* story titles, and Frank back in the stories. So, in 1911, it was decided to start the school cycle yet again after Dick's graduation by introducing Frank's *son,* Frank Merriwell jr., suddenly of age to enter Fardale himself. (*Tip Top* itself marked the appearance of Merriwell jr. by changing its own name slightly to *New Tip Top Weekly.*) Frank's son was considerably more of a hit than Dick, being cautiously shaped a good deal like his father, ventriloquism and all, but his fresh appeal did little to boost *Tip Top's* flagging sales. The 856 weekly Merriwell novelettes, however, had been reprinted by Street & Smith into a set of 204 paperback books, which the publishing house kept in print well into the 1930s.

Frank Merriwell continued elsewhere, though. Patten developed him in script form for a daily comic strip drawn by Jack Wilhelm, which was published in 1933 and 1934 without wide success, and eventually featured him as middle-aged, small-town gadfly in a wartime preparedness novel called *Mr. Frank Merriwell,* published in 1941. There is little action or adventure in this last, tired book (at its high point of conflict, Mr. Merriwell "thrashes" four hoodlums with his cane), and it must have come as a sharp disappointment to his earlier readers who came across it.

Gilbert Patten died at 78, in retirement at the home of his son in Vista, California, on January 16, 1945.

Heroes continue. But there probably never will be another Merriwell. Colleges no longer hold a distant, romantic mystique for American youth, and are no longer seen as places of wondrous athletic heroism. But Patten's hero himself is as integral a part of American popular lore (literary values aside) as Tom Sawyer, Popeye or Leatherstocking, and he may well live in the public imagination as long as any of them.

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Each painting in the edition is truly an original work of art—entirely handcrafted from the initial shaping of the copper base to the final, critical framing of the completed piece. Consider just a portion of the painstaking effort lavished on each painting.

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- **Flawless painting was only the beginning of the demands placed upon master artists. Much of the incredibly minute detail was so delicate they had to work with the aid of powerful magnifying glasses.**
- **Countless hours were spent hand cutting and trimming gold and silver leaf to enrich highlights of each painting. The sky was done on a solid silver background . . . the American flag on silver leaf cut precisely to fit . . . the American eagle on solid gold leaf. The brilliance of the red in the flag was created by the combining of solid gold during the enameling process.**
- **Utmost care had to be exercised at every stage of the processing of each painting. A single slip at any point and the piece was destroyed as a total loss, regardless of the days and weeks which had already been invested in it.**

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Jefferson began building Monticello in 1769, worked on and at it with pleasure for the following 40 years.

". . . Architecture is my delight, and putting up, and pulling down, one of my favorite amusements," he said.

By Sir Francis J. B. Watson

America's first universal man had a very acute eye

The inimitable Thomas Jefferson—President, author, statesman—was also preeminent in the fine arts, as shown in a current exhibition

Thomas Jefferson had a remarkably sharp eye. From Houdon's bust or Gilbert Stuart's portrait (opposite) the eyes of the third President of the United States apprise the spectator and the world with a razor-sharp scrutiny. While still quite a young man in college, Jefferson described himself as possessing a "canine appetite" for learning and refers to the "supreme delight" he took in observation and scientific experiment. Lord Clark has reminded us that the third President was more than merely a man of the Enlightenment. He was the only American of his time whose character and interests conform to Leon Battista Alberti's Renaissance ideal of a universal man: one of all-around learning and accomplishment in whom thought and action form an interrelated unity.

The vista of Jefferson's encompassing regard for the visual arts is evoked in a comprehensive exhibition of paintings, sculpture, drawings, decorative arts and architectural drawings and models mounted by the National Gallery of Art as a major Bicentennial effort

A seldom-seen Gilbert Stuart, Jefferson was painted on wood with a pastel-like tonality.

Mr. and Mrs. Donald B. Straus, New York

under the title "The Eye of Thomas Jefferson." The show runs from June 5 through September 6.

Even before his eye had enlarged its field of vision by visiting Europe, a French traveler, Chastellux, described him, not without a certain patronizing air, as "a man . . . whose mind and attainments could serve in lieu of all outward graces, an American who, without having ever quitted his own country, is Musician, Draftsman, Surveyor, Astronomer, Natural Philosopher and Statesman."

When in August 1784 Jefferson arrived on what he described as "the vaunted scene of Europe," in fact in Paris, he came officially as a statesman, for he had been appointed to negotiate a treaty of friendship and trade with the French government. But much of the next five years he spent in looking closely at his unfamiliar surroundings with the eyes of "an enthusiast of the arts," as he wrote to Madison at the time.

It was a good moment to arrive in the French capital. Although the French Revolution was only five years away, the anticipatory rumblings were quite faint as yet. Paris was still the cultural and intellectual focus of the civilized world.

In the field of architecture, Jefferson's favorite amongst the arts, there was a new spirit in the air. A great deal of building was going on, especially of private hôtels, or mansions, in which the best architectural minds of the period were chiefly engaged. In and around the Champs-Elysées, where Jefferson himself had settled for his stay in Paris, some of the most important creations of the rising architects of the day were springing up. Claude-Nicolas Ledoux's Hôtel de Mlle. Guimard, built for the famous dancer of that name, had received the delighted acclaim of all critics when it had been completed a decade earlier. Even nearer to Jefferson's own Hôtel de Langeac was Boul-

Former director of London's Wallace Collection, Sir Francis is the current Samuel H. Kress Professor at Washington's National Gallery of Art.

lée's recent Hôtel de Brunoy, a daring attempt to combine the requirements of a domestic residence with the monumental appearance of an antique temple; Kamsetzer's Hôtel de la Reynière with its sensational new Pompeiian decorations was only just around the corner, and Bélanger's exquisite Louis XVI pavilion of Bagatelle, built for the King's younger brother, the Comte d'Artois, was a few hundred yards away.

All these things Jefferson drank in with avidity. What he learned from them was to play an important role in his own work as an architect.

Architecture was by no means the only art in which Jefferson interested himself during his residence in Paris. But always it was the contemporary that interested him rather than the old-fashioned, whether in architecture, sculpture or painting.

The domestic arts interested him, too. From his earliest days in Paris Jefferson had been accustomed to visit the shops of the *marchands-mercier* (those purveyors of all that was most smart and up-to-the-minute in the decorative arts) and made many purchases of furniture, silver, clocks, barometers, lamps and textiles from them. For some things, notably a coffee urn and some goblets, he furnished his own designs, for he delighted to make measured drawings for such decorative objects.

During his five years' stay in Paris as Minister Plenipotentiary, Jefferson made three important expeditions: in 1786 he went to England; in the following year he visited southern France and northern Italy; and in 1788 he visited John Adams in Amsterdam. The first of these tours stimulated his interest in gardens rather than his love of architecture. What particularly interested him in Great Britain was the landscape gardens. These were perhaps England's principal contribution to European sensibility in the 18th century, and the taste spread all over Europe.

The Louvre, Paris

Maison Carrée, a Roman temple in Nîmes, France, inspired Jefferson's plan for capitol at Richmond.

Massachusetts Historical Society, Boston

Derivation from temple is clear in Jefferson's sketch for front elevation of the Virginia capitol.

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Thomas Jefferson Memorial Foundation

Silver coffee urn Jefferson bought in France in 1788 exemplifies his taste for the classically elegant.

Thomas Jefferson Memorial Foundation

Based on bronze Roman *askos*, a wine or oil vessel, is silver version ordered by Jefferson in 1801.

With Adams, Jefferson spent a week visiting some of the most famous examples. Together they visited William Kent's Chiswick, "Capability" Brown's Blenheim, the Duke of Buckingham's magnificent park at Stowe where, more than anywhere else, the visitor can still see a carefully designed series of views evoking the paintings of Claude and Salvator Rosa, the basic theme of the *jardin anglais*. At Monticello, Jefferson made some attempts to lay out the garden on these lines and designed several garden temples for it on the English model. Gardening meant much to him. Toward the end of his life he told Charles Willson Peale that "if heaven had given me a choice of my position and calling," it would have been the career of a gardener he would have chosen.

Contact with the realities of English architecture on which he had trained himself disappointed him. He found English houses were built "in the most wretched style I ever saw." Partly, no doubt, this was due to having been brought into contact with French architecture before he had seen any English buildings. More importantly, perhaps, the French houses he had seen with their small rooms, their careful attention to comfort, convenience and the amenities of social intercourse, seemed better adapted to the conditions of life in the young republic than the drafty enfilades of what Sir John Vanbrugh called "the Stately Rooms of Parade" which characterized the principal floor of most Palladian mansions.

By far the most important of Jefferson's European

trips for the formation of his taste in architecture was the visit he paid to southern France. Provence brought him for the first time into direct contact with the buildings of classical antiquity. From Nîmes he wrote enthusiastically to his friend Madame de Tessé: "I am immersed in antiquities from morning to night. . . . Here I am, Madame, gazing whole hours at the Maison Quarrée [sic], like a lover at his mistress. . . . I have been nourished with the remains of Roman grandeur." The sight of this small building was a climactic moment in Jefferson's life and remained with him for the rest of his days. It was to meet his eyes again a few months later in Paris where he saw Hubert's romantic view of it (p. 90) at the Salon.

The most notable consequence of Jefferson's "love affair" with what he described as "the most perfect and precious remain of antiquity in existence . . ." was the form given to the state capitol at Richmond, Virginia. Before leaving for Europe, Jefferson had prepared a design of a classical temple character for the seat of government of the state of Virginia, but it had been rejected on the grounds of economy. For the revised scheme, he wrote to Madison, "We took for our model what is called the Maison Quarrée." While still in France Jefferson employed the French architect Charles-Louis Clérisseau, who had already drawn the building for his book *Monuments de Nîmes,* to have a slightly modified reduction of the building made in plaster as a guide for the design of the Richmond capitol. Minor changes had to be made to adapt the temple to the purposes of government. There were no windows at all in the original, and the cella of the temple was a single undivided space. "I drew a plan for the interior, with apartments necessary for legislative, executive and judiciary purposes," Jefferson wrote, and a number of these drawings survive. Today, unfortunately, the exterior has been radically altered by the addition of wings which inevitably detract from Jefferson's idea of an antique temple construction.

He designs a silver coffee urn

During his stay at Nîmes, Jefferson was shown a bronze *askos* (a pouring vessel for oil or wine) of Roman origin which had been excavated on the site of the Maison Carrée by the archaeologist who had supervised the restoration of the temple. He at once hit on the idea of having a silver copy made as a token of gratitude to Clérisseau for his part in the work on the Virginia state capitol building. Owing to unforeseen delays, Jefferson decided to present Clérisseau with another object reminiscent of the classical world, a silver coffee urn of his own design based on the type of "Etruscan" vase then being dug up in large numbers at Pompeii and Herculaneum. A wooden model of the

Uffizi Gallery, Florence

In his imaginary list of the works of art he would have liked for Monticello was the *Venus de' Medici.*

askos did turn up eventually. After remaining for some years at Monticello, Jefferson gave it to the portrait painter Thomas Sully, retaining for himself the silver copy based on it (p. 92).

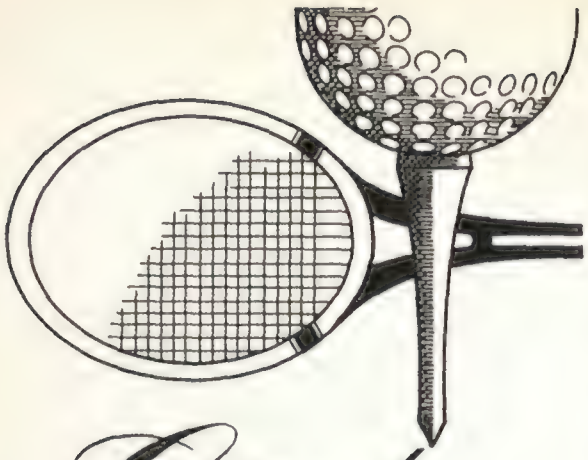
After the excitement of Nîmes, it is hardly surprising that the architecture, sculpture and paintings he saw in Turin, Milan and Genoa during his "peep into Elysium" in northern Italy merely amused him. But his brief Italian expedition was undertaken as much to study the cultivation of rice as for viewing works of art; he never got even as far south as Florence. Had he done so he might have modified his views of Italian art. At least it would have enabled him to see an object he had long admired from a distance, the so-called *Venus de' Medici*. Long before visiting Europe he had drawn up a sort of *musée imaginaire*, a list of all the great works of art he would have liked to have had in the gallery he was then planning for Monticello. Heading this list was "*Venus of Medici*. Florence," a work which for centuries has been regarded as one of the highest achievements of classical sculpture (p. 93) and something that every visitor to Florence took the earliest opportunity of paying his respects to.

On the obelisk which forms Jefferson's gravestone at Monticello, he chose to have inscribed only three of the numerous achievements of his lifetime: the Declaration of Independence; the Statute of Virginia for Religious Freedom; and the creation of the University of Virginia. The last of these was not only his proudest architectural creation but the construction into which, above all others, he poured most of the experience he had gained in Europe. As early as 1805 he had decided to abandon the conventional form of a single large university building in favor of an "academical village." The eventual layout consisted of a long rectangular lawn terminating at one end in a large domed building or Rotunda and flanked along each side by a series of lesser buildings each "a small and separate lodge for each professorship, with only a hall below for his class and two chambers above for himself; linking these lodges or pavilions were "barracks for a certain portion of the students." The end of the lawn facing the Rotunda was to be open to a magnificent mountain view (unhappily closed by an additional building in the 19th century). This layout was clearly based on Louis XIV's country chateau de Marly.

The Rotunda copied one of the most famous monuments of classical antiquity, the Pantheon, a building which Jefferson had never himself seen but knew well from architectural publications. But the Rotunda, although its exterior was most carefully copied from its Roman prototype on half the original scale, was totally altered in the interior. A floor divided the building inside and the inside of the dome was painted blue to simulate the heavens. It was Jefferson's intention to have this adorned with movable and gilded representations of the constellations thus enabling the building to be used as a sort of primitive planetarium. This idea Jefferson almost certainly took from a work by the visionary architect Etienne Boullée whose work he admired in Paris. Boullée had published a design for an immense spherical cenotaph for Newton, the interior of which was pierced with holes in the shape of the moon and stars through which light filtered into the building. Thus the Rotunda of the University of Virginia, which Jefferson regarded as his master creation in architecture and the focal point of the university, drew its character from the two sources which had excited his interest most during his visit to the Old World, the buildings of classical antiquity and the most recent creations of the avant-garde architects working in Paris.

Early on during his stay in Europe, Jefferson wrote to Madison: "You see I am an enthusiast on the subject of the arts. But it is an enthusiasm of which I am not ashamed, as its object is to improve the taste of my countrymen. . . ." That he achieved his aim cannot be doubted, and if contemporary witness is needed it may be found in a letter that the great American architect Benjamin Henry Latrobe wrote to Jefferson in 1807. It is the letter of a professional addressed to an amateur and its admiration is unqualified. "It is not flattering," Latrobe wrote, "to say that you have planted the arts in your country. The works already created are the monuments of your judgement and your zeal and of your taste."

Graceful but rarely visited room—because of narrow staircase—is elegant, domed third floor of Monticello. Added in 1800, it was once put to use as a storeroom.



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Nessie at last? This image on a frame of 16-millimeter film is being seen by some as head, long neck, forebody, and front flippers of a large animal.

By John P. Wiley jr.

Cameras, sonar close in on denizen of Loch Ness

Tall tales of Scotland's most famous attraction may well be true; large animals apparently inhabit the lake

Unaware of media and scientific controversy over their existence, a "population of large animals" seems to live in the cold, peat-dark waters of Scotland's Loch Ness, eating fish and occasionally breaking the surface. No remains have ever been found, there are no living specimens in zoos or dead ones in museums, but new evidence has persuaded a number of expert observers that a Loch Ness "monster" is there.

The views of George R. Zug, a curator of reptiles and amphibians at the Smithsonian's National Museum of Natural History, are significant. Summarizing the evidence before a packed auditorium, Zug said:

"I started as a skeptic. Now I believe there is a population of large animals in the loch. I don't have any idea of what they are; I have no way of identifying them. And I'm not going to try to identify them until I meet one eye to eye."

Some of the evidence that is changing minds in the scientific world is on these pages. These photographs were taken simultaneously with sonar readings that revealed moving objects 20 to 30 feet long. The pictures appear to show the head, neck and upper body of an animal moving vertically; a diamond-shaped flipper attached to a body; and a close-up of a head. They are from 16-millimeter film. The frame showing the flipper was computer-enhanced at the Jet Propulsion Laboratory in Pasadena, using the same techniques developed for pictures returned by planetary probes.

The evidence is strong enough so that the British House of Commons is being asked to protect the denizens of the loch, whatever they are.

George R. Zug, a Smithsonian curator of reptiles, answers questions after a lecture on Loch Ness. He lists himself as believing animals exist.

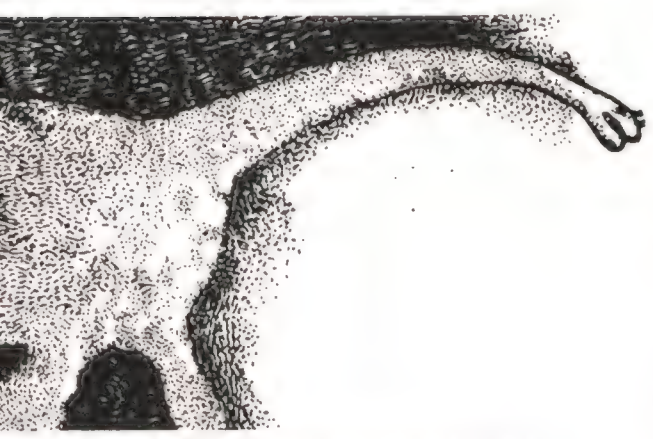
These pictures were first publicly presented last December 10 in the House of Commons for just that purpose. To meet the requirements of British law, Sir Peter Scott, chairman of the World Wildlife Fund, and Dr. Robert H. Rines, president of the Academy of Applied Science in Boston, proposed a scientific name for a beast no one has seen, in the accepted sense of the word—*Nessiteras rhombopteryx*. It means the "Ness marvel with a diamond-shaped fin."

Protection for the Loch Ness animals is no idle exercise. One man at the Zug lecture argued that the next step should be to kill one for study. After all, he said, "if they are a viable population, killing one will not hurt. And if they are about to become extinct anyway, taking one will not change anything." The Japanese have offered to send over a whaling vessel to harpoon one.

Zug replied that, as an anatomist, he would like to have a specimen to dissect, but acquiring knowledge of the living animals and their conservation must have first priority.

Today we seem to be somewhat closer to solving a mystery that has been intriguing for a long time. Large, mysterious creatures have been reported in Loch Ness for centuries. Saint Columba, the man who brought Christianity to Scotland, is said to have encountered one in A.D. 565. By 1827 Sir Walter Scott was referring to the Scottish monster. Most medieval references had been to the water-horse, not to mention leviathan, worme, dragon or hippotam. Some writers have tried to bring out similarities between the loch monsters (Ness is not the only loch in Scotland reported to have one) and the accounts of dragons going back to the beginnings of written history. In fact, Zug pointed out that before the 1930s, when widespread publicity gave rise to hoaxes, it was pretty well accepted locally that something big lived in the loch; mothers used to warn their children not to climb on any horselike animals that approached the shore.

But in the Thirties loch monsters became what today is called a media event. In July 1933, a businessman and his wife told reporters that an elephant-colored creature with a long neck and a body at



Turned horizontally, this is artist's impression of the top left photograph.

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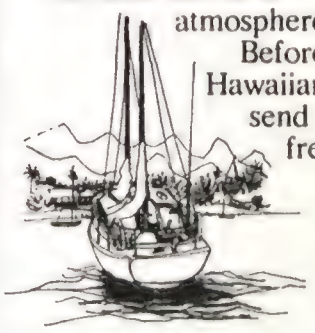

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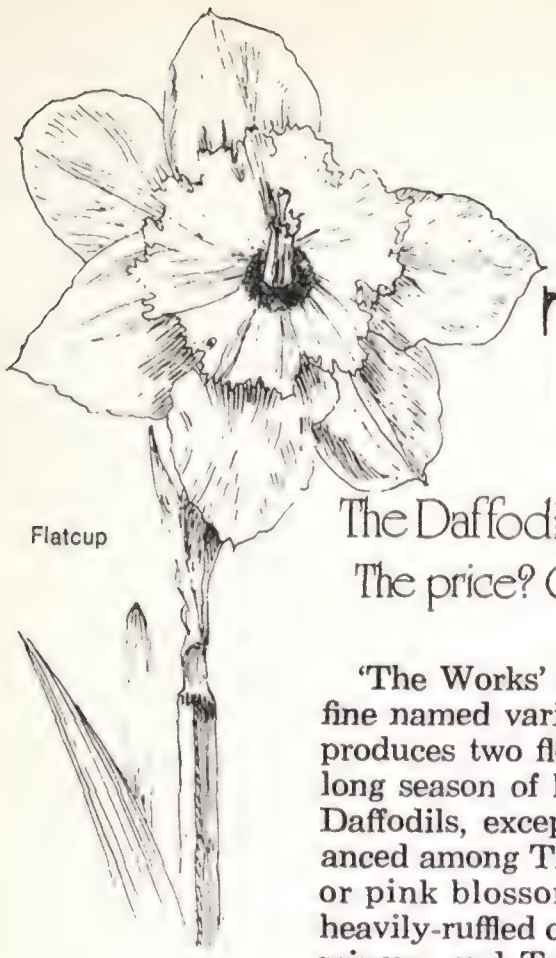
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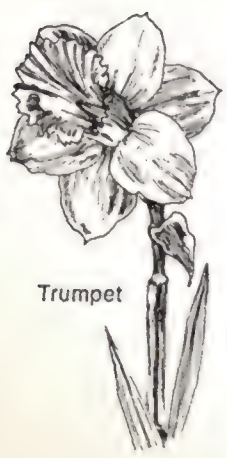
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Zug discusses a 1934 picture of what looks like an animal with a long neck

least 12 feet long had crossed the road in front of their car and disappeared into the loch. A report of something on the surface was published in newspapers around the world that November. Then a London newspaper's account of finding a monster's tracks along the shore turned out to be a hoax perpetrated by some children using an umbrella stand made from the hind leg of a hippopotamus. Sightings became so suspect that the remarkable picture taken in 1934 (above) was widely scoffed at even though no one ever proved that the picture was a fake or that the photographer, a member of the Royal College of Surgeons, had any reason to fake it.

The pace picked up in 1960, when an aeronautical engineer named Tim Dinsdale shot movie film of one of the creatures swimming across the loch and then parallel to one shore. It was later submitted to the British Joint Air Reconnaissance Intelligence Centre, which

swimming on the surface of Loch Ness. Hoaxes have plagued serious investigators.

said that it "leaves the conclusion that it probably is an animate object."

Surface surveillance continues under the coordination of the Loch Ness Phenomena Investigation Bureau (the sort of title that could identify a Smithsonian activity), headed by a Member of Parliament, David James. Coverage of a lake 24 miles long and a mile or more wide is not easy, however, especially when some of the shoreline is inaccessible. In addition to its own visual and photographic surveillance, the bureau also investigates and compiles data about other sightings.

Underwater photography is an obvious answer, but that is not simple either. The lake plunges to depths of 700 feet (975 in one spot). More inhibiting, the water is full of peat particles that quickly attenuate artificial light and make it impossible to photograph anything more than about 30 feet away.

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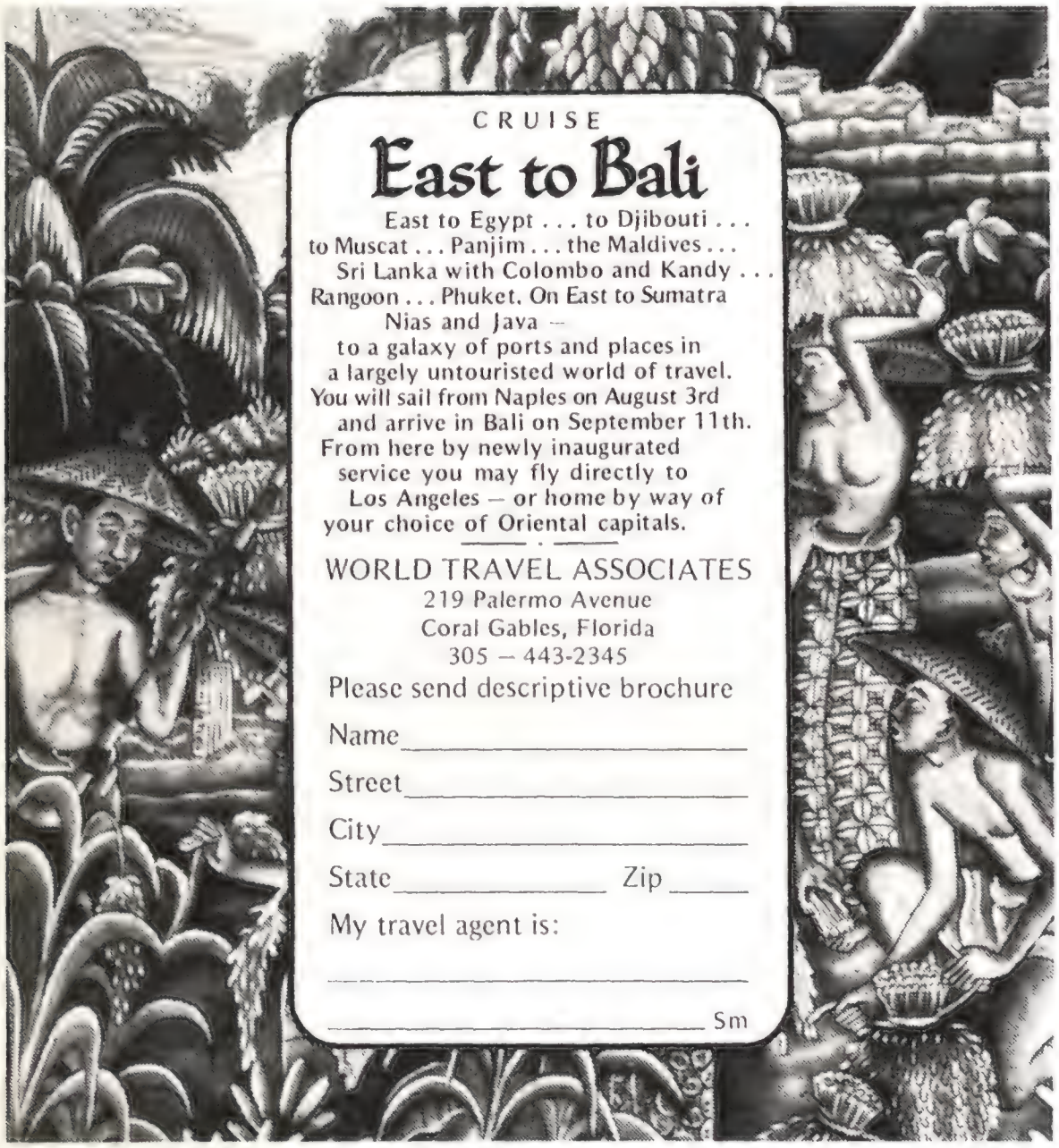

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A camera rig is readied on the barge that will take it about 300 feet from shore

sonar, a sort of radar using sound waves that was perfected to find submarines. That was the system used by Rines and his team to obtain these pictures. Rines began to investigate Loch Ness in 1969. In 1970 he returned with a sonar rig and recorded moving objects that were 10 to 50 times larger than the fish detected many times before.

In 1972 he first used both an underwater camera with a strobe light and sonar. About 1:40 A.M. on August 9, when he could see salmon jumping to get away from something, the sonar showed a large object moving through its beam, followed shortly by a second large object. A photograph taken at exactly the same time shows a blurred object. Experts who looked at the sonar records were not told of the photograph, yet identified one part of the sonar image as an "appendage," about ten feet long, on one of the two objects. That appendage is believed to be the flipper in another photograph (pp. 104-105). In a third photograph, taken 45 seconds earlier, the flipper appears in a different position. It had moved during those 45 seconds. Based on focusing considerations, the Boston group estimated the flipper to be four to six feet long.

(It was at this point that Zug became directly involved. He and a colleague were asked to look at the pictures and see if they could see anything that would match up with the large sonar blips. He said they could clearly see salmon, eels and crustaceans in some of the pictures, but could not make out what was on the "monster" frames. When the same pictures were computer-enhanced, Zug said,

and lower it 80 feet to a ledge. Silt clouded lens when something swam by.

he then saw what he calls a "flipperlike structure associated with or attached to a robust body.")

For the next two years the Rines team came home empty-handed. Then last year they obtained more photographs, enough to set off a furor. The torso shot (p. 96) was made at 4:32 A.M. on June 20; the head picture (p. 102) was made at 11:45 A.M. the same day. Believers see in the torso picture a long, curving neck and the front part of a large body with two flippers showing. The middle part of the neck is curved so far back that it is shadowed and does not show up well. Critics are not so sure. Some have dismissed the picture as merely a cloud of bubbles. Others argue that it is the prow or stern of a sunken Viking ship; the "flippers" then become the oars. The same critics contend that the "head" shot could just as well be a carved dragon head of the kind used to embellish Viking vessels.

Whatever was caught in the head photograph was close enough to move the camera: in the preceding and following frames the camera has been flipped up, so that it photographed the bottom of the boat from which it was suspended, and the water surface.

In that picture the head is about five feet from the camera and appears to be about two feet long. Is it really a head? Zug thinks so. "I see bilateral symmetry—matching left and right sides," he said, and quickly added, "I hear snickers" from unconvinced colleagues. Others have suggested it is the decomposing head of a Highland steer or a stag.

The Rines pictures have suffered some-

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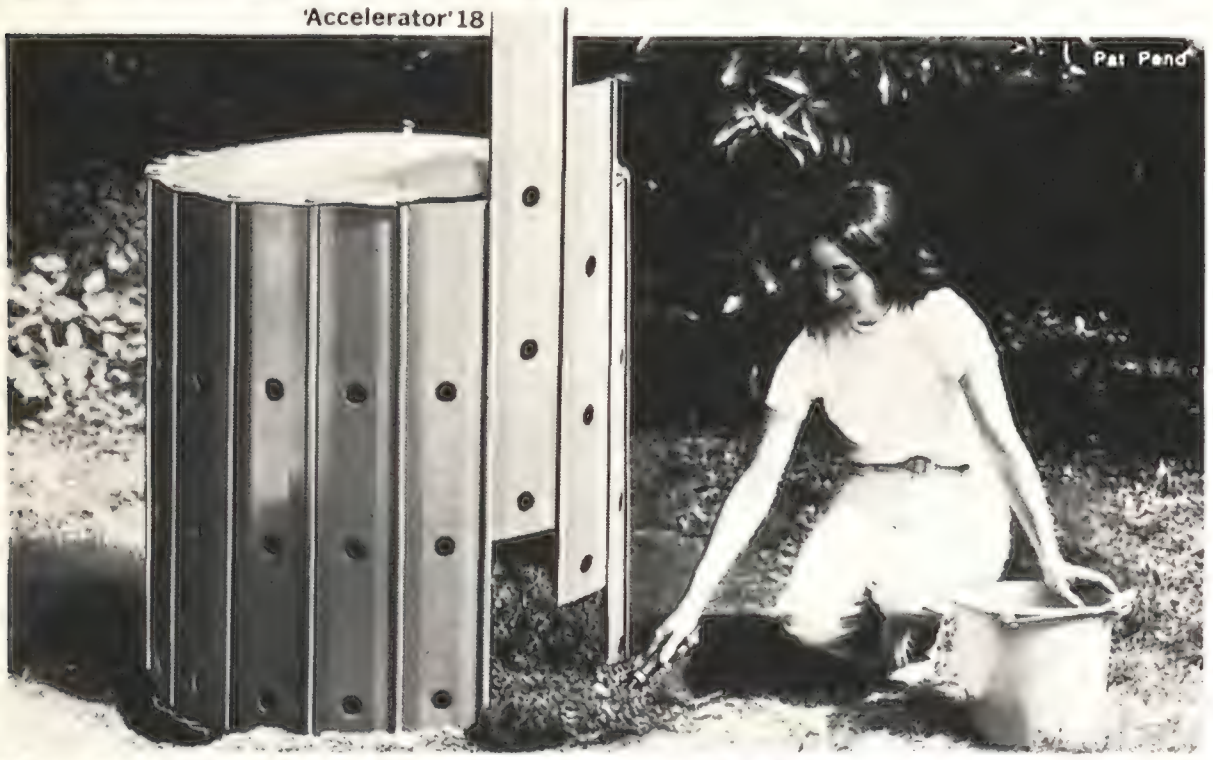

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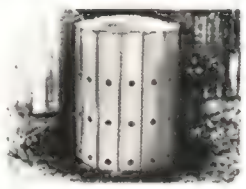
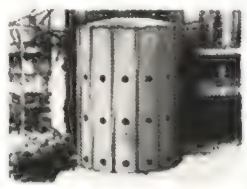


'Accelerator' 14 For smaller gardens. 3 ft. x 27 ins. 11½ cu. ft. Use on soil. $39.80.



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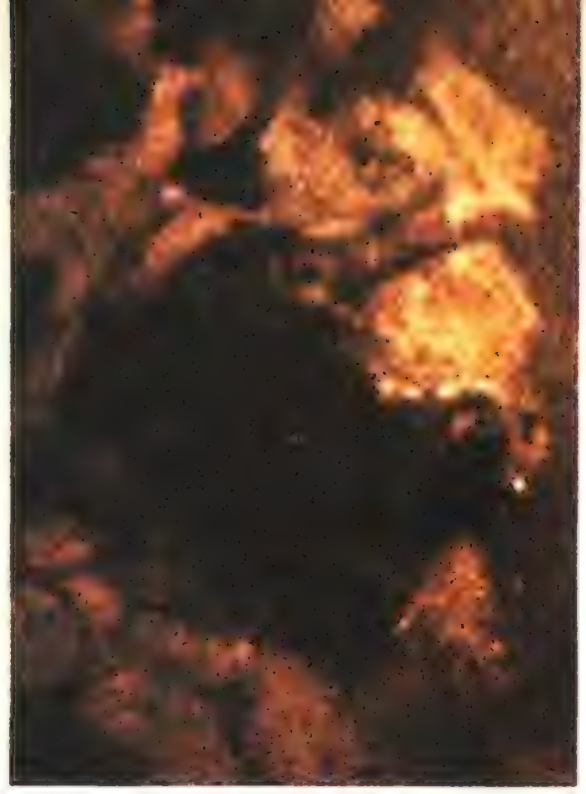

This is the head view, in which some scientists detect the bilateral symmetry characteristic of life. Sir Peter Scott's rendition is below.

thing of the same fate as the 1934 surgeon's picture. A scientific conference to discuss them was to have been held in Edinburgh last December. But premature publication of a chapter from a popular book and hyped-up publicity in the press caused the sponsors to withdraw. Only the hearing in the House of Commons saved the results from the limbo reserved for UFO reports.

Now, Zug says, one doesn't have to suffer ridicule if one takes the Loch Ness animals seriously. The scholarly British scientific journal *Nature* is leaning the same way: "In the next [episode], the natural history of Loch Ness may even become a respectable line of study."

Hoaxes continue, however. In January

From the Smithsonian—A piece of history.

The time is August, 1858. President Buchanan and Queen Victoria exchange messages. There are parades and fireworks throughout the land (and *Harper's Weekly* notes that, in New York, the roof of City Hall was inadvertently set afire). The occasion? The laying of an Atlantic Telegraph Cable linking England and the United States. Only functional for a brief time, it foreshadows complete success in 1866. And, Messrs. Tiffany & Co., jewellers, purchase the balance of the cable left on board the *U.S.S. Niagara* for sale to the populace in souvenir lengths.

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a company that makes home television games fabricated a "videosonar" tape showing a Loch Ness monster, apparently to gain publicity for its exhibit at the Brighton Toy Fair. It later admitted the hoax.

More genuine pictures will be made—if not this summer, then next. The Boston team will be back with a tremendous battery of scientists from all disciplines, and from England, Scotland, Canada and Norway as well as the United States. Other groups will be there, too, above and below the water. This summer the Rines group will include Harold E. Edgerton, Institute Professor Emeritus at MIT, who invented the stroboscopic light in 1931 and has designed camera equipment for Jacques Cousteau. No one knows yet what they will find when they finally come up with clear pictures of the animal. One man, after 35 years of study and several sightings of his own, wrote a book arguing it is a worm. Others have suggested a giant, long-necked seal.

Any speculation has to take Loch Ness and its history into account. Until 10,000 to 15,000 years ago, what is now Loch Ness was buried under the glaciers of the last Ice Age. Whatever may be in the loch has arrived there since that time. If the animals should turn out to be plesiosaurs, fish-eating marine reptiles that once were so successful that more than 30 genera are now recognized, the question will be where they were between 65 million years ago, when they disappeared from the fossil record, until they turned up in the

This 1972 picture appears to show a flipper and a portion of a large body.

loch. (The oceans may be a partial explanation. Answering questions after his April talk, Zug said some ocean sightings of serpents or monsters are very reminiscent of Loch Ness sightings. Zug pointed out that most of the lakes where "monsters" are reported were recently connected, geologically speaking, to the sea.)

Another known fact about the loch is that the bottom water is very cold, about 42 degrees. Whatever lives there must be able to function in water of that temperature, which is right at the limit for an aquatic reptile.

We can make some estimates of their ages and numbers. Zug pointed out that for a creature to grow to the size postulated, a lifetime of at least 20 years is conservative. Their numbers may be determined, at least in part, by the food supply. Despite the disagreement about the quantity of salmon, Arctic char and eels in the loch, some limits can be set. Zug quoted figures of 10 to 20 individuals, if the animals weigh around 3,000 pounds, to as many as 150 if they weigh only about 330 pounds.

There's something in the loch, something big, even though we don't know what. It now seems likely that we will find out in the near future, and for some the knowledge will be a little saddening as well as fascinating. The mystery will be gone (as may be the unlamented promotions of tourist boards and whisky companies). The zoological record may be a little richer, but the world of our imaginations will be a little poorer.

The given species name, *rhombopteryx*, is Greek for a diamond-shaped fin.

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Book reviews

Keep the Last Bullet for Yourself
Thomas B. Marquis
(The Two Continents Publishing Group, $8.95)
Custer in '76; Walter Camp's Notes on the Custer Fight
(Brigham Young University Press, $10.95)

The definitive book still hasn't been written on Little Bighorn (p. 58), surely the world's most overexamined battle. But until that happens, a couple of new versions published for the 100th anniversary of that bloody afternoon will do nicely, despite some shortcomings.

One book propounds a theory and tends to arrange the facts almost too neatly to support it; the other presents facts in wild profusion with three different kinds of footnotes and several conflicting statements. Somehow the two books complement each other.

Briefly, the theme of *Keep the Last Bullet for Yourself* is that Custer's soldiers, being green troops filled with fearful stories of Indian torture, had shot each other and themselves when surrounded by hordes of painted warriors. Marquis cites the fact that the cavalrymen had plenty of ammunition left at the end and that they killed only a handful of Indians.

Furthermore, the author, who was physician to the Cheyenne on their Montana reservation, challenges the notion that the Indians carried repeating rifles and "pumped their Winchesters" at the trapped soldiers throughout the fight. He maintains that Indians actually preferred, if not bows and arrows, muzzleloaders from the Civil War era because of their flexibility in hunting.

At times Marquis seems so anxious to

prove his case—an anxiety well-founded, for though he wrote the book 42 years ago, he couldn't find a publisher during his lifetime—that he stretches his conclusions a bit. For example, the fact that soldiers usually won these encounters, which he documents elaborately, isn't really relevant to his suicide theory, when you come down to it.

But whether or not one accepts the theory, which is supported to some degree by Indian testimony, the book makes fascinating reading for its information about the world of the Indian fighter and his opponents, about Custer and Major Reno, both of whom Marquis feels have been libeled by history.

Chief Rain In The Face. From Camp book.

To me the most interesting discovery in the book was that the soldiers had been expecting at most 1,500 Indians and that "these reports were, of course, based on Indian Office information received from local agents on the Dakota reservations. The agents declared that they had only a few absentees. . . . Government allocations were made according to a per capita count on each reservation. Every agent, therefore, had the constant incentive to claim the continual presence of all the Indians—and more—who belonged on the reservation under his control."

Imagine, then, Custer's emotions when, after splitting his force into three small parties, he rode over that hill and beheld,

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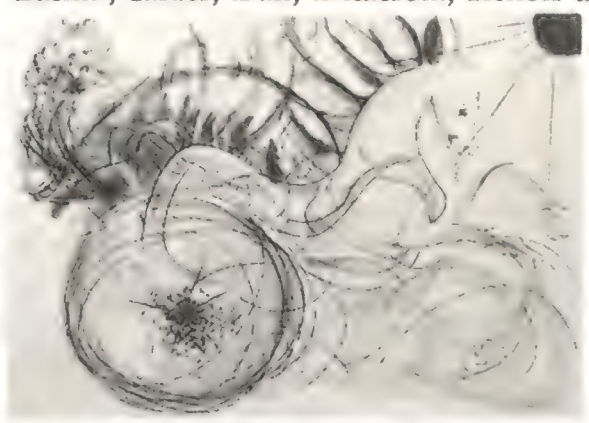

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reportedly, 1,800 lodges. That would mean probably some 12,000 Indians, including 3,500 to 4,000 warriors—most of whom seemed to be charging right at him. No wonder his men panicked.

Walter Camp (not to be confused with the inventor of the All-American college football team) has a quite different appeal in his notebook. Left unfinished at the writer's death in 1925, it remains raw data, at first irritating in its conflicts and repetitions, but gradually taking hold as the reader realizes that these bits of testimony from combatants on both sides are as close as he is ever going to get to the smells and the sounds and the fury of the melee on Custer Ridge.

From Camp's interview notes we glimpse the chaos of those final minutes: Curley, an Indian scout who was invited to leave the field and save himself just before the last stand, tells of the soldiers firing two volleys. Not speaking much English, he did not know if this was a call for help. Turtle Rib, a Sioux, chased one escaping soldier, who appeared to be getting away when he shot himself. When Turtle Rib returned, "the fight was nearly over. The Indians were up close, and the soldiers were shooting with pistols. He saw some of the soldiers shoot each other. The Indians were all around."
—Michael Kernan
Feature writer, the *Washington Post*

The Constant Pest: A Short History of Pests and their Control.
George Ordish
(Scribner's, $12.95)

Readers of these pages last February (p. 131) will recall that modern man was seriously being encouraged to use insects as a source of protein. Now it seems that "Eat your way to a pest-free environment!" could be the ultimate slogan of an itching, bitten, stung and terribly hungry 20th-century man.

That particular strategy for dealing with pests is perhaps the only one overlooked in man's attempts to rid his undergrowth and his underwear of things that go bump in the night. To be sure, men have always walked—and doubtless still walk—the line between furrows to pick off tender and appealing wrigglers, but apparently that was more an attempt to improve their diet than a response to crop damage from insects. Or so says George Ordish, an English horticulturist

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LONG RANGE COMMUNICATIONS

The PocketCom's range is limited only by its 100 milliwatt power and the number of metal objects between units or from a few blocks in the city to several miles on a lake. Its receiver is so sensitive, that signals several miles away can be picked up from stronger citizens band base or mobile stations.

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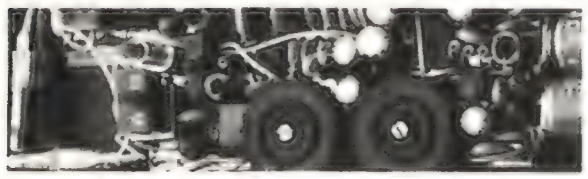
To use the PocketCom simply turn it on, extend the antenna, press a button to transmit, and release it to listen. And no FCC license is required to operate it. The PocketCom has two Channels—channel 14 and an optional second channel. To use the second channel, plug in one of the 22 other citizens band crystals and slide the channel selector to the second position. Crystals for the second channel cost $7.95 and can only be ordered after receipt of your unit.



The PocketCom components are equivalent to 112 transistors whereas most comparable units contain only twelve.

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You can page another PocketCom user, within close range, by simply pressing the PocketCom's call button which produces a beep tone on the other unit if it has been left in the standby mode. In the standby mode the unit is silent and can be kept on for weeks without draining the batteries.

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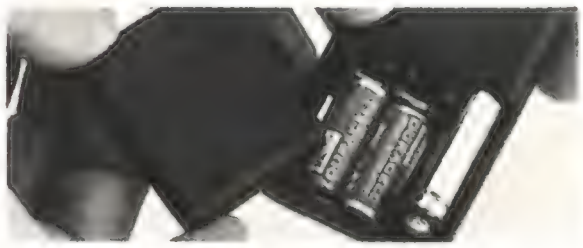
Just check the advanced PocketCom features now possible through this new circuit breakthrough: 1) Incoming signals are amplified several million times compared to only 100,000 times on comparable conventional systems. 2) Even with a 60 decibel difference in signal strength, the unit's automatic gain control will bring up each incoming signal to a maximum uniform level. 3) A high squelch sensitivity (0.7 microvolts) permits noiseless operation without squelching weak signals. 4) Harmonic distortion is so low that it far exceeds EIA (Electronic Industries Association) standards whereas most comparable systems don't even meet EIA specification. 5) The receiver has better than one microvolt sensitivity.



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The PocketCom has a light-emitting diode low-battery indicator that tells you when your 'N' cell batteries require replacement. The integrated circuit requires such low power that the two batteries, with average use, will last weeks without running down.

The PocketCom can be used as a pager, an intercom, a telephone or even a security device.

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Many businesses can use the PocketCom as a multiplex intercom. Each employee carries a unit tuned to a different channel. A stronger citizens band base station with 23 channels is used to page each PocketCom. The results: an inexpensive and flexible multiplex intercom system for large construction sites, factories, offices, or farms.

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The PocketCom is manufactured exclusively for JS&A by Mega Corporation. JS&A is America's largest supplier of space-age products and Mega Corporation is a leading manufacturer of innovative personal communication systems—further assurance that your modest investment is well protected. The PocketCom should give you years of trouble-free service, however, should service ever be required, simply slip your 5 ounce PocketCom into its handy mailer and send it to Mega's prompt national service-by-mail center. It is just that easy.

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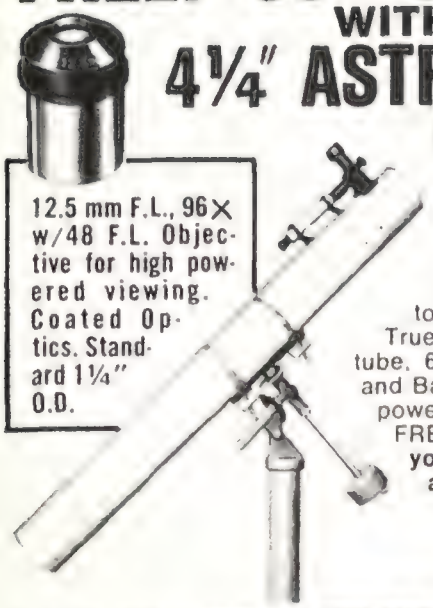

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who has spent a lifetime solving insect and fungus problems worldwide. Here he reviews all of Man's skirmishes in the continuing war with The Pest, complete with body counts and a hopeful prognostication on Man's arsenal for future battles. You will be relieved to hear that biological controls get the nod over chemical ones—even though the answer is based on economic reality rather than ecological disaster. More on that later.

In the past, excommunication was often tried. In A.D. 1120—the year of the birth of John of Salisbury, that paragon of scholastic philosophy, and also the year that the Chinese are said to have invented playing cards—the Bishop of Lyons interdicted the region's caterpillars and field mice. And in 1485, the year of Bosworth Field, the High Vicar of Valence hauled all the local caterpillars before his court, assigned a lawyer to speak for them, and commanded them to leave the area. Was it effective? Probably, suggests Ordish, because "a heavy outbreak of an insect pest is usually followed by a big increase in that pest's parasites and predators." If only today's pesticides were that effective!

The trouble is, too many pesticides kill not just the offending insects but also their natural enemies. The result is that it takes only a few members (or eggs) of the target population to reestablish themselves with a vengeance, largely free of whatever it was that hunted them.

What is so striking about Ordish's impressive and solidly researched book is that, through the years, the ham-fisted imprint of Man is too often implicated in pest uprisings. The Colorado beetle *(Leptinotarsa decemlineata)* was a solitary beetle living a dainty existence in the Rocky Mountains until frontier farmers introduced it to the mind-blowing potato. Drunk with gluttonous delight, the fiend reeled East at about 50 miles a year, established itself on the Atlantic seaboard in 1874, and took hold in Europe during World War I.

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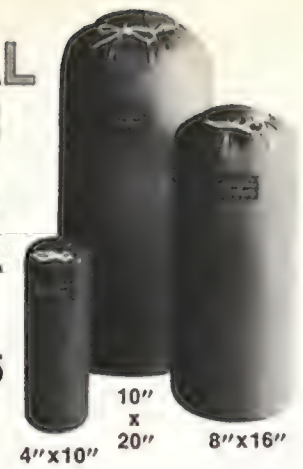

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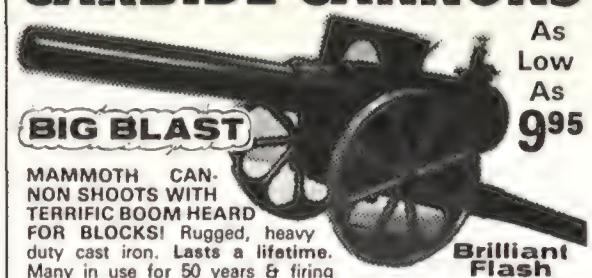

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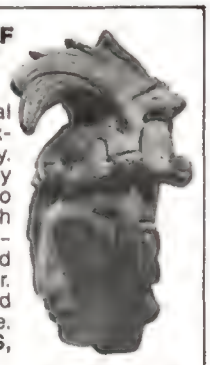

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Finally, consider the fortunes of the gypsy moth *(Porthetria dispar)*, which was brought from England by a Harvard researcher with an eye to harvesting its silk. It took but a few escaped moths to establish a major threat to large stands of American forest.

What does the future hold? It is Ordish's contention that although chemical pesticides do the job, they are simply too expensive. Economics has a way of making its presence felt: while ecologists are to be thanked for the defeat of DDT, Ordish points out that modern chemicals are much more profitable to manufacturers and thus were greatly preferred over DDT in spite of ecological howls.

Instead, biological controls are the wave of the future. It is probably possible to genetically engineer a species of beetle that might attack and destroy a poppy plant, thus minimizing the problem of heroin addiction. Presumably, you'd have no trouble with the insects, all suitably docile and dopey until the next nibble.
—Michael Olmert
Writer and critic

The Exploring Spirit: America and the World, Then and Now
Daniel J. Boorstin
(Random House, Inc., $6.95)

Had the telephone been invented earlier, Pulitzer Prize-winning historian Boorstin speculates, the Louisiana Purchase might never have doubled our then size. Or, an episode involving the British mail steamer *Trent* might have cut short the Civil War by starting a foreign war and forcing North-South unity.

But there were still the therapies of distance and delay. Technology had not yet created "this curious upside-down world" in which parking ranks with sex, politics, death and taxes as "the most modern symbol of the Fall of Man."

Boorstin's 100-page revision of a series of radio lectures for the BBC singles out "the dark continent of technology," exemplified by telephones and especially television, as the worst threat to a spirit of exploration which he believes was germane to the new American nation.

Dedicated to the Smithsonian Institution as "keeper and catalyst of the exploring spirit," the Smithsonian's former senior historian (now Librarian of Congress) evenly divides his own exploration into a quick survey of America's nurturing of this spirit and a warning against

"It was an event of a certain moral splendor, but the witnesses to the scene could hear no golden trumpets sounding."

"The progress of the Bill of Rights into the world has been so long and wearisome that its birth last week seemed almost routine, like the approval of some measure to clean a public well."

The last moments before passage of the Bill of Rights were sheer semantic drudgery, the months of controversy winding down in the drone and murmur of deletions and word changes.

By now the Bill of Rights is so revered that we think of its birth as perfect and painless. Perhaps the greatest value of TIME's second Bicentennial Issue—the one for the week of September 26, 1789—is the evidence it gives that there was no magic in America's creation;

only the capacities, which we still have now, to resolve discord and confusion with clear thinking and hard work.

The moral becomes uniquely clear in TIME's presentation of history as journalism. And that in turn is merely the logical extension of TIME's basic premise: to present news in a way that makes something happen inside the reader's head.

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the dangers by which it is threatened.

Columbus, according to Boorstin, represents a *discoverer* rather than an *explorer*, reflecting most of human history during which men feared and shunned the unknown and cautiously sought only what they knew or thought they knew.

"Climbing the mountain simply because it is there, is *not* an idea as old as the hills," he suggests. "The discoverer simply uncovers, but the explorer opens."

And what better place for exploration to flourish than "the American Void," a "continent-wide laboratory" to which entire communities could be transported intact to begin recording history on a blank page, stimulated by "Fertile Verges," the edges between anything of the earth or mind "that makes every man and woman willy-nilly into an explorer."

Short of voyages to outer space, Boorstin wonders, could there have been better circumstances to "revise and enlarge man's view of all human experience" than in this new Zion whose citizens were beholden only to the living? "Each generation as a distinct nation," in Jefferson's words; each declaring "the Sovereignty of the Present," in Boorstin's.

"The United States, then, rested on the shockingly simple notion that nation-building was not the monopoly of gods and ancestors, that it could be a do-it-yourself activity" (Boorstin).

In the 20th century, however, the new technology "would tend to neutralize or destroy some peculiar American opportunities," Boorstin warns, posing a Law of Inverted Distance: *Advancing technology tends to have a proportionately much greater effect on large quantities than on small.*

The result of "a fantastic increase in man's Power to Leap," the technology (television, planes with movies and headsets, encapsulating cars) that overcomes physical barriers of distance increasingly isolates and segregates Americans with an enlarged sense of the present.

Culprits include: "the celebrity-everything" (product, entertainer, politician, newscaster) and the personality "well known for his well-knownness"; "the sieve of relevance"; news which has become "afferent and efferent" and is delivered by "parish priests" (local TV reporters) or "cardinals" (network anchormen); "contagion of the annual model"; and, "the 'disposable' everything."

How to keep the "neighborliness of the near" and prevent "technology from

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With the growth of the Smithsonian Associates, the Institution is striving to meet the needs of its membership by offering a varied travel program. Traditionally, Foreign Study Tours provided culturally oriented, first-class, specialized trips under the guidance of museum curators or experts in respective fields. Then, Domestic Study Tours were added to offer similar opportunities within the United States, thus allowing Associates and their families a chance to combine vacation with a period of study. A year ago, Foreign Charter Tours were introduced; these trips are larger, lower-cost and more generalized in nature. Associates travel benefits are announced exclusively in SMITHSONIAN. Write addresses below for additional information.

Domestic Study Tours

Southwest Pueblos—August 1-8: Pueblos; Santa Fe Opera; Corn Dance at Santo Domingo • **Massachusetts Heritage**—August 15-23: Boston, Salem, Deerfield and Old Sturbridge Village to learn about early American antiques; the Boston Symphony at Tanglewood • **Wind River Mountains**—July 31-August 8: Unique wilderness experience in the lush mountain meadows of Wyoming, with emphasis on subalpine flora • **Williamsburg Family Weekend**—August 13-15: A special program for parents and children (6 through 14) to learn about 18th-century life and experiment with Colonial crafts • **Pacific Northwest**—September 7-17: A tour of Olympic Peninsula and North Cascades to learn about the use of natural forest resources • **Hirshhorn Sculpture Weekend**—September 17-19: Two days devoted entirely to the Museum's extensive collection of modern sculpture from Rodin to the minimal and kinetic pieces of today • **Coastal Maine and New Hampshire**—September 25-October 3: A nature tour of Acadia National Park and the White Mountains during the peak of foliage color • **California Wine Country**—October 3-9: Wineries, lectures and wine tasting • **Desolation and Gray Canyons**—October 8-18: A white-water trip for the adventurous; explore geology, wildlife, Indian and outlaw history of Utah's Green River • **Archaeological Field School**—October 9-16: Join archaeologists in the excavations of an Illinois village ruin dating from the Mississippian Period (A.D. 900-1400) • **Colonial Williamsburg**—October 24-28: A program planned for adults to learn about life in 18th-century Virginia through tours and special lectures • Coming in November, **Art and Architecture in Philadelphia** and a **Weekend at the National Air and Space Museum** • **Washington "Anytime" Weekend**—Choose any weekend to visit the nation's capital and enjoy a special tour of the original Smithsonian building, two nights at the elegant Loew's L'Enfant Plaza Hotel, close by, and a chance to see other sights in Washington by Tourmobile (reservations required ten days prior to weekend) • Write Associates Travel Program, A & I 1270B, Smithsonian Institution, Washington, D.C. 20560 for reservations or call (202) 381-5635 for information.

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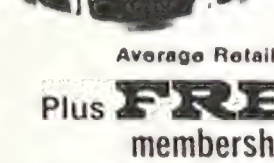

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"Every day I curse Columbus and all the discoverers of this Diabolical Country . . ." wrote a British officer 200 years ago in a surge of bitterness and frustration. Victory, as in Vietnam, always seemed to be just around the corner for the world's greatest military power confronting an enemy described by the Earl of Sandwich, First Lord of the Admiralty, as "raw, undisciplined and cowardly." What it was like to be on the losing side in that war comes instantly to life in a recently discovered batch of letters written by British officers to the Earl of Denbigh, a powerful Tory politician.

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far-flung correspondents of events and actions around the world and gained the reputation of being one of the best informed men in England. Apart from their importunings and complaints, dominant themes in many of the letters, the officers also provided lively on-the-spot descriptions of key events in the War.

Deaths in action during the American Revolution helped to break the promotion logjam. One of the early letters in the book is an account of the Battle of Bunker Hill from marine lieutenant William Feilding with a complete list of fatalities of his brother officers and an appeal to Denbigh to help him fill one of those unfortunate "vacancies."

Feilding also recounts the grim winter the British forces spent cooped up in Boston in 1775-76, with severe shortages of fresh food and blankets and "the soldiers much afflicted with the Scurvy." His troops were, he said, much reduced and "Nothing but a desire of Scourging the Insolent Rebels of our Country keeps up the Soldiers' Spirit."

Lord Denbigh in a letter to the lieutenant finds the situation hard to comprehend. Surely, he complains grumpily, you have enough troops to "oblige the Rebels to raise ye siege. And it would be more to the credit of a British Army to die in the field than to be starved within an entrenchment."

When finally the British evacuated Boston, Feilding writes, "the scene was awful and Malencholy. . . . I shou'd have been sorry to have seen the Town destroyed, tho I think its the only one on the Continent that ought not to be saved, as it was there the seeds of Sedition was first Sown, Nursed and Cherish'd."

None of Denbigh's correspondents could, however, conceive of defeat. The British victories of 1776 and the capture of New York seemed to confirm their hopes, with Captain John Bowater telling Denbigh that this "sad set of Presbyterian rascals" would soon be subdued.

But it was not to be. And finally Britain, too, found that there was no light at the end of the tunnel.

—Richard Beeston
Washington correspondent, *London Daily Telegraph*

SMITHSONIAN *plans an article on the British side of the Revolution based on a major Bicentennial exhibition in Greenwich, England, in August.*

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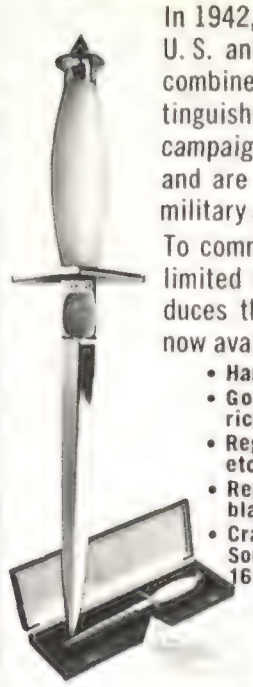

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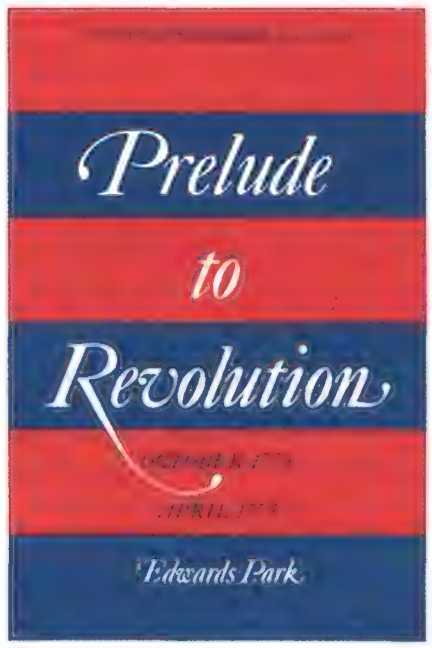

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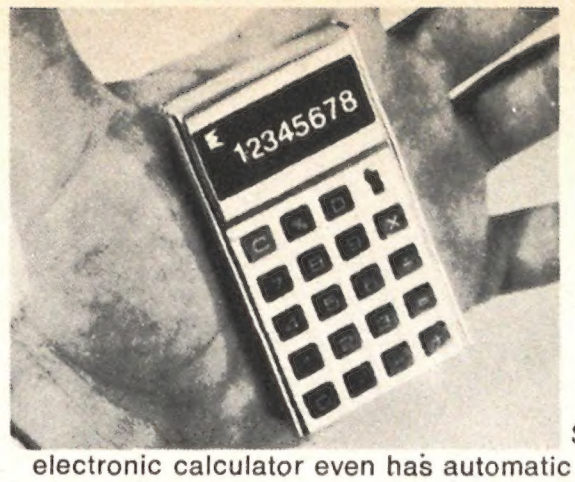

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By H. A. Drake

Sorry, Caesar's wife was not *above suspicion*

"Men willingly believe what they wish"
—Julius Caesar

The noble term "Caesar's Wife" is heard increasingly whenever the talk turns to reform of political chicanery. With it comes the image of a sainted figure, untouched by the muck and mire of political life. As James R. Polk put it recently in *The New Republic*, we must ask Congress "to be Caesar's wife, not only beyond reproach, but also beyond rumor" because there is "a special price attached to a special responsibility."

Yet I wonder how often the term would be uttered if it were commonly known that the lady in question got herself into a sordid love affair that could have severely damaged her huband's career, and that the phrase itself represents a neat piece of footwork that would win the admiration of today's cagiest pols?

In 62 B.C., Rome had conquered a Mediterranean empire but was still trying to run it with institutions that would be deemed barely adequate for even a small-sized American city. There was no fire department, no police force to speak of.

The situation was an open invitation to corruption, anarchy and strong-man rule. In the previous quarter-century, armies led by rival senators had repeatedly occupied the capital. Yet despite these assaults, the pretense of normalcy was maintained. The Republic stumbled on for another generation before submitting to Augustus, first of the Emperors.

Gaius Julius Caesar was 38 years old. Scion of a noble but decayed house, he had built a reputation as one of the millionaire Crassus' political hacks. Using widespread bribery, he had just gotten himself elected Pontifex Maximus, head of the Roman state religion—an office of immense prestige carrying with it a good deal of political clout. He was little more than another canny, less-than-scrupulous city politician, except much more daring —and more successful.

His current wife—number three by count—was Pompeia, granddaughter of the dictator Sulla (Calpurnia, who was to have bad dreams before the Ides of March, was number four). As with most Roman women, we know little about Pompeia save this: she is not likely to have married for love. Marriages in the aristocracy were political alliances, and this one had brought Caesar closer to the conservative faction of his enemies.

Pompeia was admired by one Clodius, a political rogue descended from two of Rome's oldest families. At 30 Clodius had shown skill as an organizer and rabble-rouser. His sister, the notorious Clodia, was the degenerate "Lesbia" to whom the poet Catullus poured out his heart.

He was brilliant, reckless and known as Clodius the Handsome. Hoping to consummate his passion for Pompeia, he chose the sacred ceremony of Bona Dea, the "Good Goddess," at which Pompeia, as wife of the Pontifex, was hostess. Caesar was away (for this was to be witnessed only by women). Clodius stole in wearing women's clothes and took part in the ceremony. Before it was all over, the intruder was discovered and the alarm raised.

It is hard to believe that a city that had seen so much sin could be troubled by the "Bona Dea scandal," but it was. Proud Caesar divorced his wife. Now he faced a monumental political problem. Clodius was being brought to trial.

Undaunted, the young rogue had denied everything—counting on money and influence to get him off; his defense was that he'd been out of town at the time. But Cicero said that he had seen Clodius on the day in question, and although the orator was reluctant to incur the wrath of so dangerous a figure, he testified at the trial and Clodius' alibi was shattered.

Caesar was on the spot. Clodius was a useful ally, and he had inadvertently made it possible for Caesar to discard a wife whose conservative connections were making her a political liability. Caesar refused to testify against Clodius. But the prosecution backed him into a corner. If he did not believe Clodius guilty, why had he divorced Pompeia?

Roman trials were conducted in the open, in the middle of the busy Forum. Hundreds of spectators could gather at a big trial, and it is easy to picture the silence that fell over this throng as the incriminating question was put. It was then that Caesar unloaded his bombshell.

Coolly he replied: "Caesar's wife must be above [even] suspicion."

Clodius was acquitted. But he never forgot the trouble Cicero had caused him, and later engineered the orator's exile.

Yet great as he became, Julius Caesar never became too great to appreciate a slick political move. Somewhere, even now, he must chuckle at the use to which his verbal sleight-of-hand in the Bona Dea adultery scandal is still being put. And so may Caesar's wife—or his wives.

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